THE 'NAUHEIM' TREATMENT OF DISEASES OF THE HEART AND CIRCULATION IN ENGLAND

LESLIE THORNE THORNE

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FIFTH EDITION

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MAR 25 1918
UNIVERSITY OF TORONTO

BY

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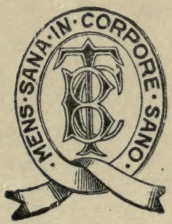

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PREFACE TO FIFTH EDITION

THE present edition has been rewritten and enlarged, and special chapters have been added on: Arterio-sclerosis and High Blood-Pressure; Angina Pectoris; Valvular Disease and Fatty Heart; Influenzal Myocarditis and Toxæmia; 'Soldier's Heart' and Heart-Strain; and Irritable Heart and Graves' Disease.

Modern cardiological research has widened and improved clinical methods of diagnosis and elaborated the means of diagrammatic illustration. All this newly acquired knowledge of the mechanism of cardiac action has helped to prove more fully the great advantage of the 'Nauheim' treatment of diseases of the heart and circulation over the old methods of treatment by drugs and rest alone. The effect of the treatment upon cardiac conductivity, which is fully illustrated by polygraphic tracings, is of the utmost interest.

I wish to express my sincere thanks to the editors

of the *Lancet* and the *Practitioner*, through whose kindness and courtesy I am enabled to include diagrams and subject-matter which have appeared in those journals.

LESLIE THORNE THORNE.

108, Harley Street, W. 1.
January, 1918.

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THE 'NAUHEIM' TREATMENT, IN ENGLAND, OF DISEASES OF THE HEART AND CIRCULATION

INTRODUCTION

I HAVE endeavoured in the following pages to give a description of the methods of administering the 'Nauheim' treatment in England in such detail that medical men who have had no previous knowledge of it may, by carefully following the directions given, avail themselves of this valuable therapeutic agent for the treatment of chronic affections of the heart and circulation.

The fact that the treatment can be given anywhere in England with results as successful as those obtained at Nauheim, cannot be known too widely amongst the medical profession, for there is no doubt that it will not be possible, or desirable, to send patients to German or Austrian spas for many years to come. Under these circumstances it is satisfactory to know that, as far as the balneological treatment of diseases of the heart and circulation

is concerned, the administration of the treatment at home has proved in every way as efficacious, and the results obtained have been as good, as those following a visit to Nauheim; indeed, there is a much wider range for home treatment than for treatment at a foreign spa, for many cases of chronic cardiac disease are quite unfitted physically to undertake a long Continental journey, whereas they are perfectly able to take a course of treatment that can be given them in their own home, a nursing-home, or an hotel.

For twenty years I have practised the administration of this treatment in London, and during that time I have treated a very large number of cases. This experience has afforded me many opportunities of comparing the results of a course of baths taken at Nauheim, with those of a previous or subsequent course in London, more especially since the year 1914, as I have had many patients under my care since that date, who had formerly made a practice of going to Germany for treatment. It is not my intention to enter into a lengthy discussion of the theories of the treatment, except in so far as is necessary and desirable in a practical handbook for the busy practitioner; but as I have not found any sufficiently detailed description of the treatment in medical literature, I have endeavoured to give one in the following pages,

trusting that it may be of value to those who are anxious to use a treatment, the great value of which has been proved in past years by the material relief and benefit large numbers of patients suffering from chronic diseases of the heart and circulation have derived from it.

There are still a large number of medical men in England who do not give these methods of treatment that place of importance which they rightly deserve as a therapeutic agent; the reasons for this are, I believe, twofold. Firstly, many are not aware of the fact that it can be administered in England with results as beneficial as those that have been obtained at Nauheim; and, secondly, there is still much misconception as to what really constitutes a course of 'Nauheim' baths, there being a widespread belief that it is equivalent to a course of *carbonated effervescing* baths. This belief is entirely erroneous. Many medical men, therefore, who have given the treatment what they believe to be a fair trial, have prescribed a course of baths which would only be suitable and beneficial to a small minority of mild cases of heart disease, and would do definite harm to more serious cases.

I am convinced that many who have hitherto not used this treatment would be led to regard it as a most valuable agent in the treatment of diseases of the heart and circulation were they to adopt

the methods of administration which I have practised in London with highly satisfactory and successful results.

Resistance-exercises are of use as an adjunct to the baths, and may sometimes be very beneficial in cases where, for various reasons, it is not possible to give the baths, or as a preliminary treatment before beginning a course.

CHAPTER I

THE ACTION AND ADMINISTRATION OF THE BATHS

THE effect produced by immersion in a 'Nauheim' bath, upon a patient suffering from cardiac dilatation, raised blood-pressure, and the accompanying more or less degenerate and flabby cardiac muscular tissue, is threefold:

(*a*) *All the cutaneous capillaries dilate.*—A fall in the blood-pressure is caused thereby, with consequent lessening of the resistance to be overcome by the cardiac contraction.

(*b*) *The cardiac action is strengthened and its frequency diminished.*—This is a natural result of diminished cardiac strain, and can be illustrated by watching the pulse, which exhibits a larger volume and a slower rate; or by polygraphic tracings, taken before and after a bath (Figs. 1, 2, 3, 4).

(*c*) *The cardiac conductivity is stimulated.*—In cases in which auricular or ventricular premature contractions are present, show-

ing the existence of an impaired conductivity, such premature contractions often disappear, or markedly decrease in frequency, during a bath (Figs. 1, 2, 3, 4).

From the above, it will be seen that the results we obtain from a course of Nauheim baths are: a slower and stronger cardiac contraction, an improved cardiac conductivity, and a lessened resistance for the heart to overcome. These results are aimed at in all forms of treatment used for cases exhibiting symptoms of failing cardiac contraction or conductivity.

By obtaining a slow and regular heart's action we obviously reduce the working-time of the heart, *i.e.*, the number of hours in which the heart muscle is in systole during the twenty-four, and in lowering the blood-pressure we reduce the amount of resistance the heart has to overcome, thereby procuring, not only a shorter, but an easier day's work for the heart; whereas, by using digitalis, we no doubt obtain a condition in which the working-time of the heart is reduced, but we do not lower the blood-pressure, and we actually hamper the cardiac conductivity, because digitalis has an inhibitory effect upon defective cardiac conductivity. Cushny*

* ' Digitalis in Auricular Fibrillation.' Cushny, *Lancet*, June 9, 1917.

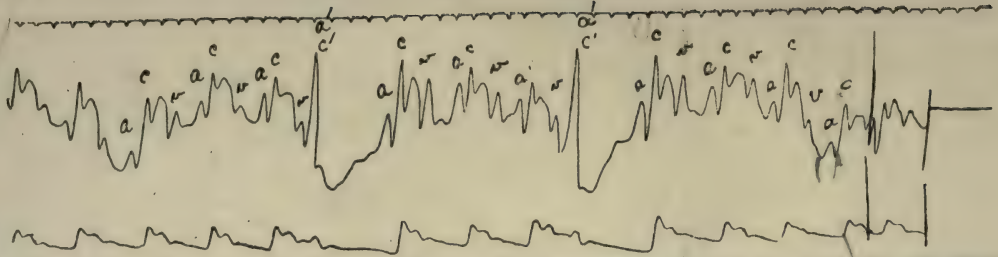

FIG. 1.—POLYGRAPHIC TRACING OF CASE I., CHAP. III., BEFORE FIRST BATH, SHOWING TWO EXAMPLES (*a'*) OF THE FREQUENT PREMATURE AURICULAR CONTRACTIONS, RATE 84 PER MINUTE. THE AURICULAR AND VENTRICULAR PREMATURE CONTRACTIONS OCCUR SIMULTANEOUSLY.

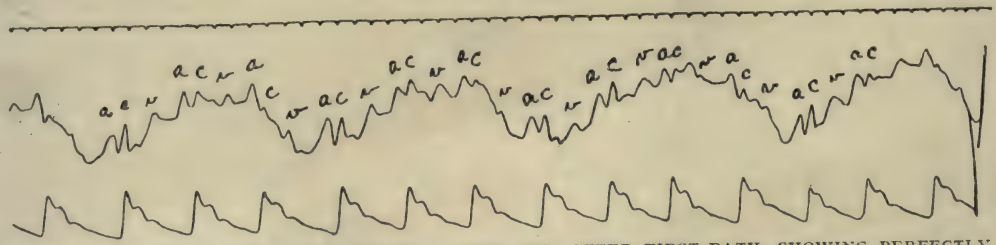

FIG. 2.—POLYGRAPHIC TRACING OF CASE I., CHAP. III., AFTER FIRST BATH, SHOWING PERFECTLY REGULAR PULSE OF STRONGER VOLUME AND SLOWER RATE, 75 PER MINUTE.

believes that, in auricular fibrillation, digitalis produces a direct inhibitory action on the cardiac muscle tissue; other authorities believe that it acts

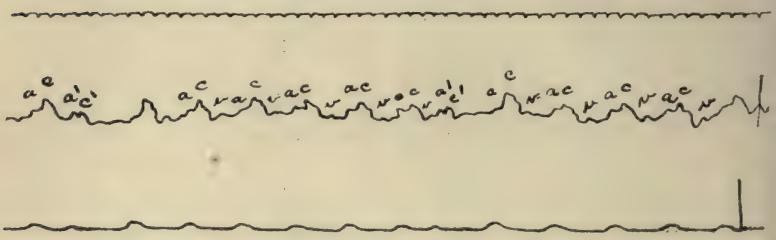

FIG. 3.—POLYGRAPHIC TRACING OF CASE IV., CHAP. IV., BEFORE BATH, SHOWING TWO EXAMPLES OF THE FREQUENT PREMATURE AURICULAR CONTRACTIONS (*a'c'*) AND A PULSE OF VERY SMALL VOLUME, RATE 75 PER MINUTE.

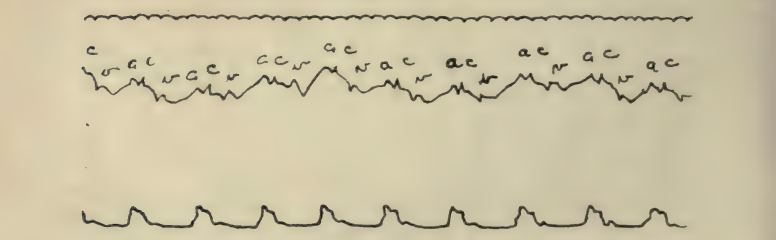

FIG. 4.—POLYGRAPHIC TRACING OF CASE IV., CHAP. IV., AFTER BATH, SHOWING PERFECTLY REGULAR PULSE OF GREATLY IMPROVED VOLUME AND SLOWER RATE, 62 PER MINUTE.

through the vagus. Many cases which are only temporarily benefited by rest and the administration of digitalis improve rapidly under a course of ' Nauheim ' baths; this is partly due to the diametri-

cally opposite actions of these two treatments upon cardiac conductivity, and partly to the reduction of blood-pressure obtained by the baths.

Since the introduction of the polygraph for clinical use it has been possible to demonstrate diagrammatically the improvement in cardiac conductivity produced by the baths (Figs. 1, 2, 3, 4), and with the aid of this instrument, in conjunction with the use of the sphygmomanometer for the accurate reading of blood-pressure records, combined with the knowledge obtained from careful auscultation and percussion, we are able to observe the effect of treatment with an accuracy and certainty which was impossible only a few years ago.

There is a danger amongst a certain school of cardiologists to rely almost entirely upon the new methods of diagnosis, and thereby to under-estimate such valuable signs as the character of the heart's sounds, and the extent of the area of cardiac dulness; if, however, this method is adopted it will lead neither to a complete diagnosis, nor to a satisfactory treatment.

The improved condition of the circulation continues for some hours after the bath, giving the heart a comparative rest, and enabling its muscular walls to regain some of that tone which a long period of dilatation has impaired. The beneficial effect of the bath remains for a longer period after each

successive immersion, and hypertension, if present, gradually decreases, so that the heart has a diminishing amount of resistance to withstand, is progressively more able to reap full benefit from the comparative rest, and more able to overcome any dilatation that may have been present at the commencement of the treatment.

The improved cutaneous circulation and strengthened heart's action indirectly affect all the functions of the body, and produce a healthier condition of all the organs and a more normal state of excretion and secretion.

It is most satisfactory to note that, when the treatment is given to a patient having a bad and inefficient circulation, with organs in a chronically congested, unhealthy, and probably degenerate condition, the improvement in the general health will continue for several months after the course is finished. This steady improvement, which I constantly see most markedly illustrated in my patients, is, I have no doubt, brought about by the comparatively slow and gradual process of repair taking place in degenerate organs, provided for the first time for some years with a more healthy and less abnormal circulation.

This occurrence is so constant a feature of the treatment that one is able confidently to tell one's patients that they will continue to improve in

health for some months after the baths have been given, and to assure those few who do not feel much immediate benefit, that they will do so in the course of a few weeks; and this assurance can be given with practical certainty that one's prognosis will prove correct.

Investigations carried out in order to ascertain the effect of any therapeutic agent upon cardiac systole and arterial tension, must, to be of any practical value, embrace a large number of observations, and those observations must be constantly repeated upon each individual patient, until the necessary details of manipulation required, have become a matter of ordinary and commonplace procedure to the subject, so that the emotions of excitement or timidity may play no part in the alteration of blood-pressure to be observed. I have carried out several hundred observations under these conditions, taking a record of the maximum and minimum blood-pressure, and the rate and volume of the pulse, before and during every type of bath that is given in a 'Nauheim' course. My observations include experiments carried out at Nauheim, with the aid of my brother, Dr. Richard Thorne Thorne. As a result of these observations, I can unhesitatingly say that I have never met a case in which hypertension was not materially lowered during the bath. I emphasize this fact because it has been often stated that

some forms of ' Nauheim ' baths cause a rise of the blood-pressure, but I have never seen definite figures to substantiate these statements. If in *all* cases of circulatory disease, irrespective of kind or degree, a *carbonated* bath was given at the *commencement* of the course, there would probably be some in which an already high arterial tension would be still further raised, but if the baths are properly administered this procedure would never be allowed.

In cases where the heart is dilated and the blood-pressure is *subnormal*, the arterial tension is usually somewhat raised by immersion in a ' Nauheim ' bath; the heart-beat is slowed and strengthened, and a more normal balance established between the driving power and the resistance to be overcome. These cases of subnormal tension in conjunction with a dilated heart are comparatively rare, as the heart does not, as a rule, dilate unless under the stress of an increased resistance to be overcome, but in patients who have passed through an acute illness, or in anæmic, thin, and debilitated subjects, the heart will sometimes give way, even when the blood-pressure is normal or below normal, and in these cases the ' Nauheim ' baths do cause a rise in tension. This rise, however, is never a large one, and averages usually from 5-10 millimetres Hg.

The following tables of blood-pressure and pulse-rate, before and during the baths, are taken from

cases which differ greatly from each other as regards the condition of the heart and circulation, the only point in common being that in all, with the exception of Case IV. and the record of my own blood-pressure, hypertension was a marked symptom.

CASE I.

	Blood-Pressure.	Pulse-Rate.
	Millimetres Hg.	
Before	210	96
1 minute after immersion	200	96
3 minutes ,,	180	92
5 ,, ,,	180	92
6 ,, ,,	188	92
8 ,, ,,	180	88

CASE II.

	Blood-Pressure.	Pulse-Rate.
	Millimetres Hg.	
Before bath	170	72
3 minutes after immersion	165	72
6 ,, ,,	145	76

CASE III.

	Blood-Pressure.	Pulse-Rate.
	Millimetres Hg.	
Before bath	180	76
2 minutes after immersion	160	76
4 ,, ,,	164	72
8 ,, ,,	160	72

CASE IV.

	Blood-Pressure.	Pulse-Rate.
	Millimetres Hg.	
Before bath	140	64
3 minutes after immersion	128	54
5 ,, ,,	120	54

CASE V.

MY OWN BLOOD-PRESSURE TAKEN IN A SPRUDELSTROM BATH AT NAUHEIM.

	Blood-Pressure.	Pulse-Rate.
	Millimetres Hg.	
Before bath	130	68
2 minutes after immersion	120	68
4 ,, ,,	110	72
6 ,, ,,	100	72
8 ,, ,,	100	68
10 ,, ,,	100	70

CASE VI.

	Blood-Pressure.	Pulse-Rate.
	Millimetres Hg.	
Before bath	208	76
2 minutes after immersion	194	72
4 ,, ,,	184	68
6 ,, ,,	188	72
8 ,, ,,	184	66
10 ,, ,,	188	64

These observations, in conjunction with many hundred others I have made, prove that the effects produced upon the heart and vessels by artificially

prepared ' Nauheim ' baths are identical with those obtained at the natural springs.

In studying the above tables it will be noticed that the pulse is not *always* lowered in rate during the bath. This, I believe, is due to the fact that the material alteration in tension, produced in a few minutes, requires a more rapid cardiac action to fill the dilated vessels, and therefore the heart, though relieved from some of its work and able to contract more easily, does not *always* steady down to a much slower beat till a short time after the bath. If the pulse-rate is taken twenty minutes or half an hour after the bath, it will be found to have materially diminished in rate, whilst still maintaining its improved volume. I have not recorded the minimum pressures in these tables, as I find that the effect produced upon them is very similar to that produced upon the maximum pressures, though the variations are not usually so great.

The diminution in the cardiac dulness which is often noted after a bath is the natural result of the more efficient contraction of an ill-acting, flabby, and dilated organ. It is much more marked in some cases than in others, being more apparent in those in which *much* dilatation of the heart, with only *slight* hypertrophy, is responsible for the increased cardiac dulness, and practically absent in those in which there is *much* hypertrophy with

only *slight* dilatation; hence it follows that one may judge fairly well as to the suitability of a case for the treatment, by the effect a bath produces upon the cardiac dulness.

There has been much discussion as to whether this diminution of cardiac dulness is real, or whether it is only an apparent contraction caused by an expansion of the lungs, and a consequent overlapping and masking of some of the dull area. That the decreased dulness indicates a real contraction of the heart is, in my opinion, the only logical conclusion one can arrive at, to explain the undoubted improvement in the circulation which is usually noted after a single bath. What, however, is of far more import than the above, is the fact I have conclusively proved, not only by percussion, but by X-ray tracings, taken before and after treatment; that the result produced by a *whole* course of baths upon a suitable case of cardiac dilatation is a marked diminution, or, in many cases, an entire cure, of that unsatisfactory and dangerous condition.

The Administration of the Baths.—It is not possible to lay down a definite and universal rule applicable to the management of all patients, as the degree and kind of disease, and personal idiosyncrasies, materially affect the regulation of details in this treatment as in all others; but the following directions for carrying out a course will enable any

medical man who is willing to give time and trouble and careful personal attention to each case, to give the Nauheim baths with every certainty of obtaining satisfactory results.

Taking, for example, a case of dilated, irritable heart, a sequel of influenza, causing symptoms of vertigo, palpitation, dyspnœa, insomnia, cardiac pain, lassitude, and general invalidism, I begin by giving a three or four minutes' bath at a temperature of 96° or 97° F., containing 5-6 pounds of Droitwich salt,* and 6-7 ounces of calcium chloride. The pulse is carefully noted before, during, and after the bath, and the result aimed at, and usually obtained, is a diminution in frequency, an increase in volume, and a lowering of tension.

The patient goes to bed for one hour after the bath, and is not allowed to read, write, or talk during this time, the after-effect of the bath generally inducing a comfortable sleep. A bath of similar strength, temperature, and duration is given the following day, if the effect of the first one was satisfactory.

On the third day, the resistance-exercises are given instead of a bath, the patient resting for a minute or so between each movement, and lying down for half an hour after them.

I make a practice of being present during the first

* Droitwich salt is obtainable from any salt merchant. If this is not obtainable, common salt can be used.

bath for the purpose of taking the pulse, for I find that this is the surest way of being able to regulate the baths so that the patient may receive the fullest benefit from them; it would also enable one to order the patient out of the bath if any signs of faintness should appear. I have fortunately, however, never had to curtail a bath for this reason.

In an ordinary case I watch the effect of the bath in this manner twice a week, and am able thereby to regulate the course much more satisfactorily than if I had to depend for guidance entirely upon polygraphic tracings and diagrams of cardiac dulness.

When present at the bath of a female patient I have a sheet across the bath provided with four or five tape-loops to hang on to hooks fixed on the wall-side of the bath; this sheet the nurse adjusts after the patient is immersed.

A tightness and oppression of the chest is sometimes felt during the bath, and in some cases the pulse-rate does not fall till twenty minutes or half an hour after, but in all cases a definite diminution of pulse-rate is produced.

If the pulse increases in rapidity during and after the bath on two or three successive occasions, it is practically always due to one of the following reasons: either the patient is having baths the strength, temperature, frequency, or duration of

which do not suit; or he is not a suitable case for the treatment; or he has had as long a course as his constitution can undergo with benefit. The first of these three causes is the one I generally find to be most often responsible for this undesirable symptom, which, however, rarely occurs from any cause.

Frequency of the Baths.—The baths are given on two consecutive days, and the exercises on the third day, for the first week or fortnight, according to the severity of the case, and the result produced upon the heart's action.

After the first week or fortnight baths are given for three days in succession, with an interval for exercises on the fourth day.

In my opinion it is a mistake to give baths for more than three successive days in any case, though some may derive benefit by having the exercises daily for the last week or ten days of the course.

In cases where there is a great deal of debility and cardiac dilatation, baths given every other day during the first part of the course, with exercises on the intervening days, are often found to produce the best result, and are less likely to fatigue the patient.

The number of baths taken in a course varies from twenty to thirty, any greater number than the latter being likely to weaken the patient, and

to decrease, rather than increase, the good that has been done.

The average length of a course is from four to six weeks, rarely seven. In the case of a male patient the course is shortened by a week, as the interval for the menstrual period does not have to be considered.

Strength of the Baths.—The first bath contains 5-6 pounds of Droitwich salt and 6-7 ounces of calcium chloride. The bath is so filled that the patient is immersed up to the neck, the quantity of water required for this purpose being about 45 gallons. If the bath is unusually large, and therefore requires more water than this to properly fill it, I add a little more salt and calcium chloride, in proportion to the extra quantity of water used.

With young, fairly robust patients, whose blood-vessels are not degenerate, and whose constitutions have not been weakened by long illness, I often begin the course with a bath of 6-7 pounds of salt and 7-8 ounces of calcium chloride; but with middle-aged, old, or debilitated patients, I find the weaker bath the best.

If the patient does well, and the circulatory system reacts well, the strength of the baths is increased by 1 pound of sodium chloride and 1 ounce of calcium chloride every second bath up to the tenth or twelfth.

To the tenth or twelfth bath I add one-half of a carbonated effervescing bath, at the same time reducing the sodium chloride by about 1 pound and the calcium chloride by about 1 ounce. If this change proves satisfactory, I again start raising the strength of the baths, as in the first instance, by 1 pound of sodium chloride, and 1 ounce of calcium chloride every second bath, increasing also the effervescence to three-quarters of a carbonated bath, at about the sixteenth, and an entire one at about the eighteenth or twentieth.

By the end of the course the patient is having a bath containing from 14-16 pounds of sodium chloride, from 15-17 ounces of calcium chloride, and the whole of an effervescing bath.

Duration of Immersion.—I begin by giving a three or four minutes' bath, and, in an average case, I find the greatest benefit is obtained by lengthening the time by one minute every second bath, shortening it, however, by one or two minutes when the first effervescing bath is given.

In cases where the cardiac affection is not serious, and in which the circulatory reaction is not easily obtained, it is unnecessary to shorten or weaken the bath on addition of the effervescing ingredients. Some patients, especially those who are taking a second course, can begin with baths of five to six or even seven minutes' duration and rise to sixteen or

even twenty minutes towards the end of the treatment; but I regard it as unwise to give such baths to any patient whom I have not treated before, and of whose powers of circulatory reaction I have not obtained a previous knowledge.

Temperature of the Baths.—The first bath is given at a temperature of 96° or 97° F., this temperature being lowered 1° F. every second bath down to 93° F., or even lower, in exceptional cases. In many cases a good reaction cannot be obtained if the temperature of the bath is below 95° F.; under these circumstances I adhere to that temperature throughout the course.

As the water cools less rapidly in hot weather, the patient can with advantage take a bath of lower temperature then than when it is cold, and an effervescing bath may be prescribed at a lower temperature than a still one, without the patient feeling cold and without interfering with the circulatory reaction.

Unless the weather is very warm, I always let the patient have a hot-water bottle in bed after the bath; and under these circumstances, if he does not remain comfortably warm, I regard it as an indication for raising the temperature of the bath.

It is a noteworthy fact, and one that points to a much improved circulation, that a bath which would produce coldness and cyanosis of the extremities at

the commencement of a course is usually productive of a sense of warmth and comfort, and a marked improvement of colour, towards the end of the treatment.

Some patients, especially those of a nervous temperament, suffer from marked rigors after the bath. These manifestations are rare, and when they do occur are not indicative of cold, as the extremities remain warm and of good colour. I have usually found them to indicate the fact that either the length or the strength of the bath given is not suitable, or that the patient has had as many baths as can be taken with advantage.

There are, however, some patients who experience these rigors from the first, but in these cases the rigors are usually slight, tend to decrease at each successive bath, and are not of any serious import.

There is a widespread belief, not only confined to the general public, but also amongst the medical profession, that a 'Nauheim' bath is essentially a *carbonated effervescing* bath, and it is due to this belief that the 'Nauheim' treatment is often given absolutely wrongly, and naturally produces unsatisfactory, and sometimes alarming, results. It cannot be too strongly urged upon those who use this treatment that they cannot make a worse mistake than by giving a carbonated effervescing bath in the first instance, and that if they do this

they court failure, and bring undeserved disrepute upon a treatment which, when given carefully and properly, has never done a single case any harm, and has not only restored many thousands from chronic illness to good health and enjoyment of life, but has prolonged life and relieved great suffering in many serious cases. In my experience the majority of nurses, both male and female, who profess to understand the 'Nauheim' treatment, have been taught to start at the wrong end, and begin with *carbonated effervescing* baths instead of *still* baths. It is therefore of great importance that the medical man himself should supervise the baths and never leave their administration entirely in the hands of a nurse. I do not offer any excuse for emphasizing the above point, both in this chapter as well as in the introduction to this book, as I do not believe it can be brought too forcibly under the notice of those who propose to use the 'Nauheim' treatment, as it is one of the primary rules that must be adhered to if successful results are to be obtained.

The general care of a case during treatment is of great importance. No definite rules can be laid down that would be suitable to all, but it is essential in every case that the patient should absolutely give up business and social engagements, and have the digestion and bowels well attended to. When the patient is well enough to be about, a prescribed

amount of walking exercise should be taken every day.

That these general directions, carefully carried out, help to a satisfactory result is manifest, but that they are not in themselves enough to produce that result is evident from the fact that most of my cases have been more or less chronic invalids for long periods and have been treated with drugs, rest-cures, massage, and other methods, but have failed to obtain relief as rapid, satisfactory, or lasting, as that resulting from a course of baths and exercises.

Three weeks to a month's change of air after a course of baths materially increases the benefit obtained, and should be taken in every case. It is not, however, possible to lay down any universal rule as to the place best suited to the patient; age, extent and kind of the disease, personal idiosyncrasies, and the season of the year, must guide one greatly in the choice of a locality.

CHAPTER II

THE DESCRIPTION AND ADMINISTRATION OF THE EXERCISES

RESISTANCE-EXERCISES form a useful adjunct to the treatment in many cases, and there are some exceptional ones in which it is found that the baths, which have a much more powerful and rapid action than the exercises, cannot be tolerated at first; in these, a set, or part of a set, of exercises, given once a day for a fortnight or three weeks before the baths are commenced, is of very great value, and will enable some patients who could not otherwise have taken baths to do so. Cases of this kind, however, are rare in my experience (Case IV., Chapter IV.). Mechanical exercises undertaken by the patient with the aid of a machine or apparatus have sometimes been prescribed for cases of cardiac and circulatory disease, but it seems to me a self-evident fact that exercises, the force of which can be regulated by an experienced person who is taught to watch the pulse, respiration, and general condition of the patient, as a guide, and to modify

or increase the resistance to suit each individual case, are very much superior to those which are regulated by the patient's own conception of what is best for him, or by a mechanical contrivance, however perfect and ingenious that contrivance may be.

The resistance-exercises are administered by a nurse, male attendant, or by the medical man himself. They consist in a set of movements so planned as to exercise every muscle in the body consecutively, the force employed being a regulated resistance to the movements, on the part of the administrator; it is therefore very necessary that this administrator should be an experienced individual, trained to watch the pulse and to regulate the resistance used, by the effect produced.

These regulated exercises cause dilatation of the muscular capillaries, thus reducing the arterial tension, and thereby relieving the heart; a fact that is demonstrated by the pulse of increased volume, lowered tension, and lessened or unaltered rapidity, which is obtained *when they are properly given.*

To give the exercises without watching the pulse, and only to modify them when the patient shows signs of distress, such as perspiration, rapid breathing, or cyanosis, is to defeat one's object, for by the time any of these signs manifest themselves the arterial tension is probably higher and the pulse-rate more rapid than they were before the exercises.

The alterations produced upon the pulse when the exercises are properly given to a suitable case are well shown in Figs. 5 and 6, the polygraphic tracings of Case IV., Chapter IV., which I took before and after giving the exercises myself. The pulse is slowed in rate and much improved in volume, and the cardiac conductivity is also improved, a fact which is indicated by the absolute regularity of the pulse after exercises as compared with the constant premature auricular contractions which were present before the exercises were given.

As a rule, the exercises are given only on the days when no bath is taken, and I believe this to be the wisest plan to pursue all through the course, with most cases. It is sometimes advisable to give only a few exercises at first, and to gradually increase the number given until the patient is having all the exercises at each 'sitting'; but this is entirely dependent upon the condition of the patient, and the effect produced, and must be decided for each individual case. I make it a rule to give the exercises myself on the first occasion, having the nurse present to receive any special instructions.

The exercises should not be given till at least one hour after a meal; the patient, if a man, should have removed his coat, waistcoat, and braces; if a woman, she should have removed her corsets, and wear a dressing-jacket and a short light skirt. The patient

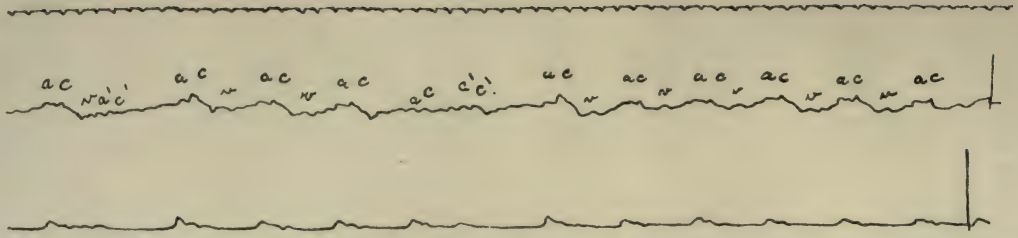

FIG. 5.—POLYGRAPHIC TRACING OF CASE IV., CHAP. IV., TAKEN BEFORE EXERCISES, SHOWING A PULSE OF 68 PER MINUTE OF VERY POOR VOLUME, AND EXHIBITING CONSTANT PREMATURE AURICULAR CONTRACTIONS ($a'c'$).

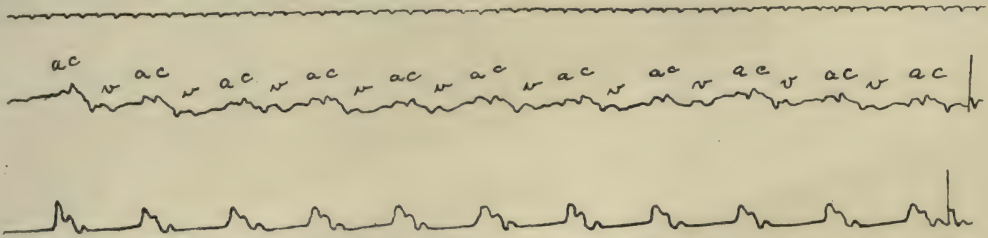

FIG. 6.—POLYGRAPHIC TRACING OF CASE IV., CHAP. IV., TAKEN AFTER HALF AN HOUR'S RESISTANCE-EXERCISES, SHOWING A PULSE OF 60 PER MINUTE, OF MUCH IMPROVED VOLUME AND ABSOLUTE REGULARITY.

should sit down for a few minutes between each exercise, and should lie down quietly for at least half an hour after they are concluded.

If the exercises tend to produce an increased pulse-rate, a raised arterial tension, or a decreased volume of the pulse, they should be given with less resistance and in fewer number. The administrator should be careful to see that regular breathing is maintained all through the exercises, as patients are often inclined to hold their breath, unless they are instructed not to, and even then they may do so involuntarily.

The exercises should be given slowly and quite steadily, with a uniform resistance, and the avoidance of any jerky movements. The position of the administrator's hands is so planned that he can offer resistance to the patient's movements during the entirety of each exercise; I shall, therefore, not repeat in the description of each exercise the fact that the administrator is to give resistance, but shall take this to be understood.

DESCRIPTION OF THE EXERCISES.

[N.B.—In the plates illustrative of the exercises the administrator is the clean-shaven man.]

Arm Exercises.

Movement 1.

The administrator and the patient stand in the respective positions shown in Fig. 7; the patient then

opens his arms, against the resistance of the administrator, till they are in the position shown in Fig. 8. The administrator now changes the position

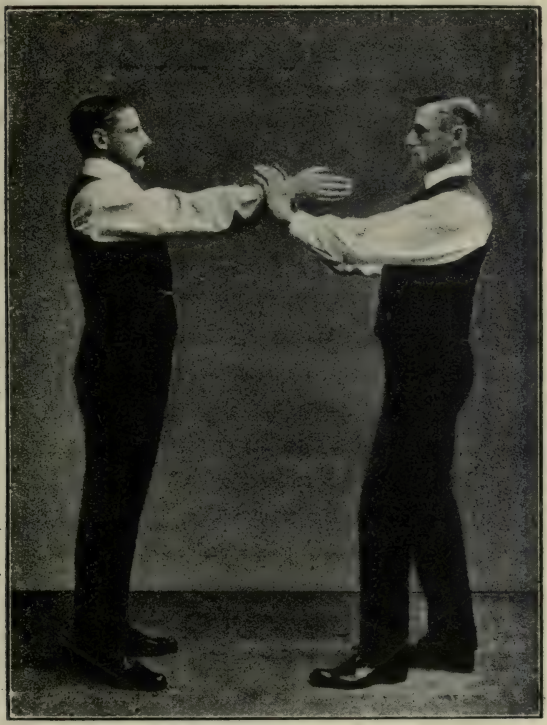

FIG. 7.

of his hands to that shown in Fig. 8, and the patient then brings his arms back to the position shown in Fig. 7.

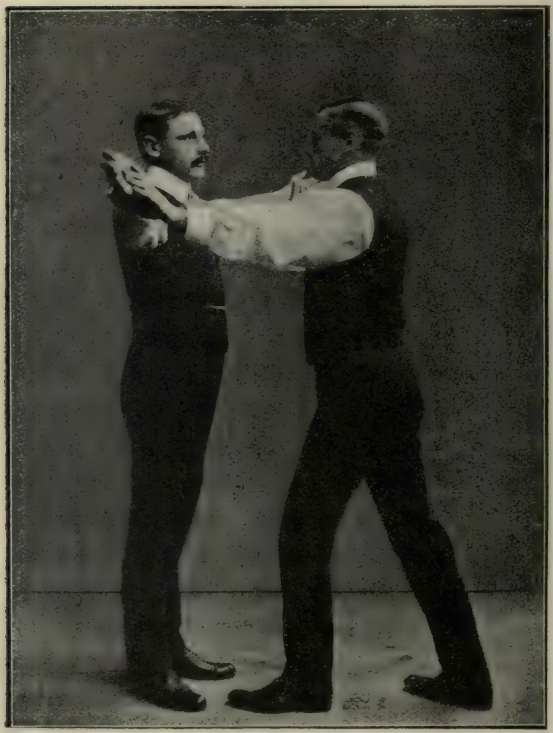

FIG. 8.

Movement II.

The administrator and the patient stand in the

FIG. 9.

respective positions shown in Fig. 9; the patient then raises his arms directly outwards and upwards

to the position in shown Fig. 10. The administrator now changes the position of his hands to that shown

FIG. 10.

in Fig. 10, and the patient then brings his arms back to the position shown in Fig. 9.

Movement III.

The administrator and the patient stand in the respective positions shown in Fig. 11; the patient

FIG. 11.

then raises his arms directly forwards and upwards to the position shown in Fig. 12, the administrator letting his hands gradually slip round to the dorsal

surface of the patient's wrists till his hands are in the position shown in Fig. 12. The patient now brings his arms directly forwards and downwards,

FIG. 12.

back to the position shown in Fig. 11, but when they have reached the position shown in Fig. 13, the administrator lets the palms of his hands slip under the patient's wrists to their ulnar surfaces, and

brings his thumbs against their dorsal surfaces; in this position he can offer the required resistance during the completion of the movement. (The

FIG. 13.

change of position of the administrator's hands, to be carried out in the middle of this exercise, is illustrated in Fig. 13, and is executed without stopping the movement.)

Movement IV.

The administrator and the patient stand in the respective positions shown in Fig. 14; the patient

FIG. 14.

then flexes his forearm till it is in the position shown in Fig. 15. The administrator now changes

the position of his hands to that shown in Fig. 15, and the patient then extends his forearm back to

FIG. 15.

the positions shown in Fig. 14. The same movement is then gone through with the other arm.

Movement V.

The administrator and the patient stand in the respective positions shown in Fig. 16; the patient

FIG. 16.

then raises his arms in their flexed position, keeping them as close as possible to the body and face, to

the position shown in Fig. 17. The administrator now changes the position of his hands to that shown

FIG. 17.

in Fig. 17, and the patient then brings his arms back to the position shown in Fig. 16.

Movement VI.

The administrator and the patient stand in the

FIG. 18.

respective positions shown in Fig. 18; the patient then raises his arms directly backwards and upwards

to the position shown in Fig. 19. The administrator now changes the position of his hands to that

FIG. 19.

shown in Fig. 19, and the patient then brings his arms back to the position shown in Fig. 18.

Leg Exercises.

In all these exercises the patient steadies himself by placing his hand on the back of a chair as shown in the illustrations.

FIG. 20.

Movement I.

The administrator and the patient assume the respective positions shown in Fig. 20; the patient

then raises the leg, slowly flexing it at the hip, directly forwards and upwards to the position shown in Fig. 21. The administrator now places his other

FIG. 21.

hand in the position shown in Fig. 21, and the patient then brings his leg back to the position shown in Fig. 20. The same movement is then gone through with the other leg.

Movement II.

The administrator and the patient assume the respective positions shown in Fig. 22; the patient

FIG. 22.

then raises the leg, slowly extending it at the hip, directly backwards and upwards to the position

shown in Fig. 23. The administrator now places his other hand in the position shown in Fig. 23, and the

FIG. 23.

patient then brings his leg back to the position shown in Fig. 22. The same movement is then gone through with the other leg.

Movement III.

The administrator and the patient assume the respective positions shown in Fig. 24; the patient

FIG. 24.

then slowly abducts the leg to the position shown in Fig. 25. The administrator now places his other

hand in the position shown in Fig. 25, and the patient then brings his leg back to the position

FIG. 25.

shown in Fig. 24. The same movement is then gone through with the other leg.

Movement IV.

The administrator and the patient assume the respective positions shown in Fig. 26; the patient

FIG. 26.

then raises the leg, slowly flexing it at the knee and the hip, to the position shown in Fig. 27. The

administrator now changes the position of his hand to that shown in Fig. 27, and the patient then brings

FIG. 27.

his leg back to the position shown in Fig. 26. The same movement is then gone through with the other leg.

Movement V.

The administrator and the patient assume the respective positions shown in Fig. 28; the patient

FIG. 28.

then brings his right foot forward, and across the front of the left foot, describing a small semicircle round the left foot, to the position shown in Fig. 29;

he then brings the right foot back, through the same semicircle, to the position shown in Fig. 28. The administrator resists the forward movements with

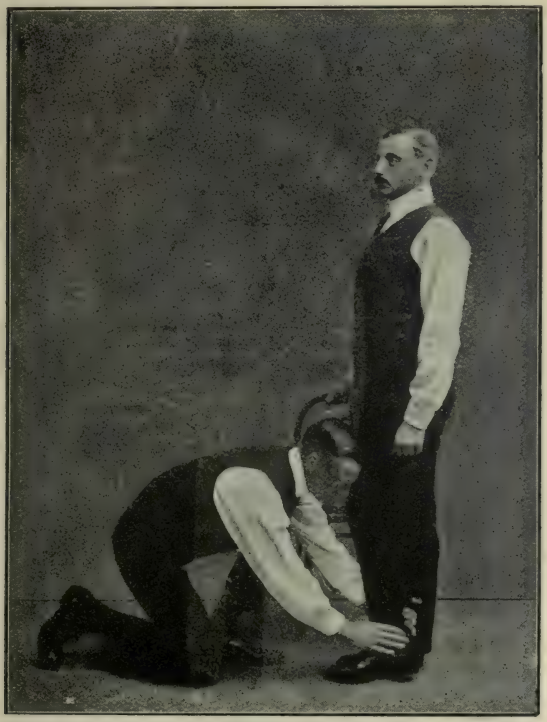

FIG. 29.

the right hand, and the backward movements with the left. The same movement is then gone through with the left leg.

The Body Movements.

Movement I.

The administrator and the patient stand in the respective positions shown in Fig. 30; the patient

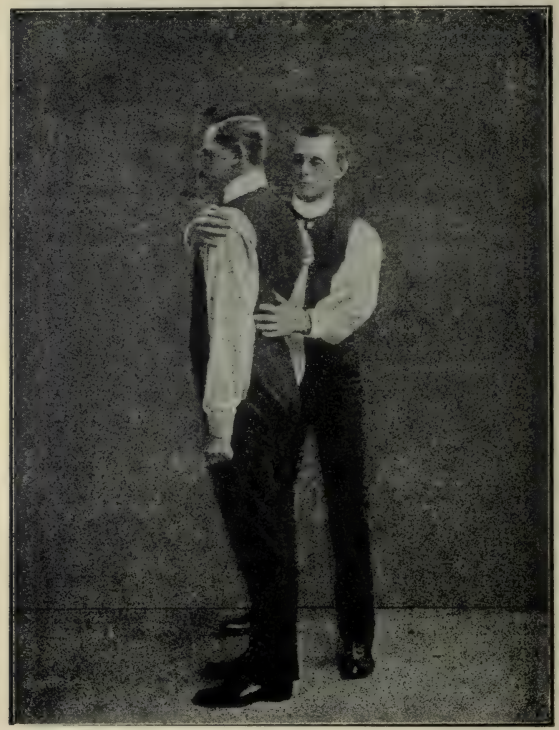

FIG. 30.

then slowly flexes his body at the hips, bending directly forwards and downwards, into the position

shown in Fig. 31. The administrator now changes the position of his hands to that shown in Fi . 31,

FIG. 31.

and the patient then brings his body back to the position shown in Fig. 30.

Movement II.

The administrator and the patient stand in the respective positions shown in Fig. 32; the patient

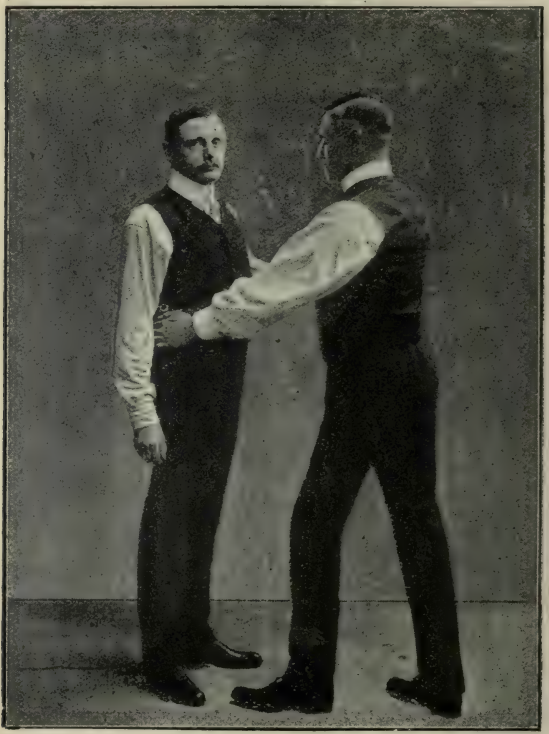

FIG. 32.

then flexes his body at the hips, bending directly sideways to the left, into the position shown in Fig. 33. The administrator now changes the position

of his hands to that shown in Fig. 33, the patient then brings his body back into the positions shown in Fig. 32, and then flexes it directly sideways to

FIG. 33.

the right, as far as possible; the administrator now changes the position of his hands back to that shown in Fig. 32, and the patient then brings his

body back to the original position, shown in Fig. 32. The administrator gives resistance, first with the right hand, then with the left, and finally with the right again.

Movement III.

The administrator and the patient stand in the respective positions shown in Fig. 34, the patient then rotates his body, on his hips, bringing the left shoulder as far forward as possible; the administrator now changes the position of his hands, placing his right hand over and behind the patient's left shoulder, and his left hand in front of the patient's right shoulder, the patient then rotates his right shoulder as far forward as possible; the administrator now changes his hands back to the position shown in Fig. 34, and the patient then rotates his body back to the original position shown in Fig. 34. The administrator offers resistance with both hands throughout this movement.

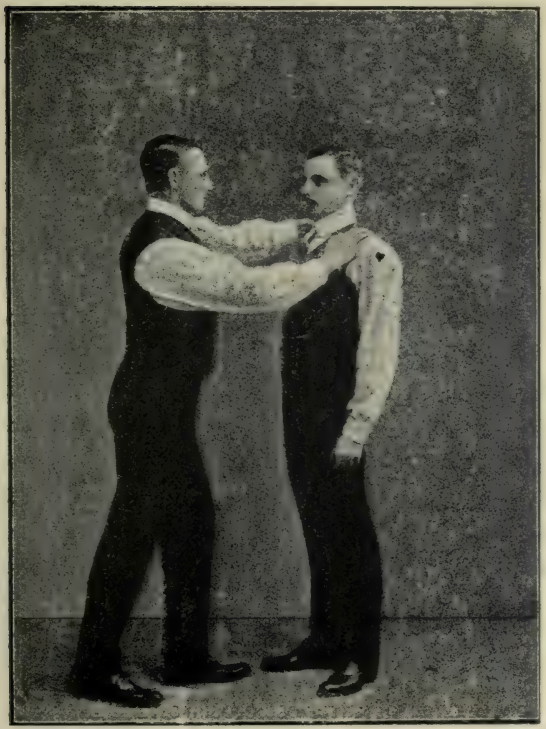

FIG. 34.

CHAPTER III

ARTERIOSCLEROSIS AND HIGH BLOOD-PRESSURE

THE consideration of the treatment of arteriosclerosis and high blood-pressure by the ' Nauheim ' methods is of the highest importance ; firstly, because these conditions are gradually assuming a more and more important place in the category of those diseases which produce a premature old age, and are responsible for an ever-increasing percentage of deaths, especially amongst the middle-aged; and secondly, because the ' Nauheim ' treatment is undoubtedly the best treatment for these conditions, and gives far better results than any other form of treatment.

The danger of arteriosclerosis and raised blood-pressure is so well illustrated by a series of consecutive cases as quoted by Dr. F. de Havilland Hall in a paper he read before the Medical Society, that I venture to reproduce his classification.

	Cases.	Deaths.
1. Cases with arterial pressure of 120 mm. and below	35	2
2. Cases with arterial pressure of 121 mm. to 140 mm.	56	2
3. Cases with arterial pressure of 141 mm. to 160 mm.	34	1
4. Cases with arterial pressure of 161 mm. to 180 mm.	19	5
5. Cases with arterial pressure of 181 mm. to 200 mm.	12	5
6. Cases with arterial pressure of above 200 mm.	17	9

In the fourth group, out of nineteen patients there were five deaths, four of which were connected with high blood-pressure. In the fifth there were five deaths out of twelve. One, a man aged forty-three, with arteriosclerosis, died of apoplexy; two and three were cases of chronic Bright's disease, aged fifty-five and sixty-seven respectively; of the remaining two cases the first, aged sixty-five, died of angina, and the latter, aged seventy-two, though suffering from arteriosclerosis, died of malignant disease. In the sixth group, with the exception of one man aged thirty-four, the ages varied between forty-seven and seventy-six years. Amongst the seventeen there were nine deaths. One died of enlarged prostate, two of arteriosclerosis, and the remaining six from cerebral hæmorrhage, more or less due to arteriosclerosis. In all these cases death

occurred within two years; in five, within six months; and in one, death took place the day after examination. Dr. A. E. Shipley, in the 'Bulletin of the Department of Health of New York,' states that deaths due to chronic heart disease, arterial disease, and renal disease, all show considerable relative and absolute increment in the last few decades. In 1912 the death-rate from these diseases, in persons aged forty-five or more, had increased from 100 to 300 per cent., as compared with the death-rate of these ages in 1868.

Dr. Theodore Janneway, in his Shattock lectures,* in discussing diseases of the circulatory system, points out the great increase in the death-rate from these diseases in New York City during the decade 1900-1910; deaths from cerebral hæmorrhage had risen 18·8 per cent., from organic disease of the heart 39·3 per cent., from diseases of the arteries 396·2 per cent.

In face of statistics such as these one cannot doubt that death from diseases of the vessels is increasing at a most alarmingly rapid pace. I hope to prove, both by statistics of cases treated and by examples of these cases, that the 'Nauheim' treatment, by lowering the blood-pressure and strengthening the cardiac action, so improves the circulation that it not only eliminates toxic poisons,

* *Boston Medical and Surgical Journal.*

which cause arteriosclerosis, from the system, and restores the patient to health; but that by so doing it retards the process of degeneration even in advanced cases, and restores the vessels to a healthy condition in the earlier ones.

In the following table I have collected cases of marked arteriosclerosis which have been under my

TABLE SHOWING RESULT OF TREATMENT IN CASES OF ARTERIOSCLEROSIS AND HIGH BLOOD-PRESSURE.

Number of Courses.	Age.	Under Observation.	Present Health.	Blood-Pressure before Treatment.	Blood-Pressure after Treatment.
	Years.	Years.		Millimetres Hg.	Millimetres Hg.
7	72	9	fair	110–240	90–225
5	61	9	good	80–180	70–130
2	63	8	good	100–165	70–140
2	73	6	died	120–300	90–190
1	55	6	fair	140–250	120–190
1	71	6	good	100–230	95–195
1	71	5	fair	100–230	95–135
2	74	5	fair	90–160	80–140
1	41	4	good	100–160	70–120
1	83	4	fair	75–170	80–160
2	55	4	fair	90–160	90–140
2	72	3	good	110–230	100–190
2	68	3	poor	130–280	112–200
1	55	2	good	80–160	80–130
1	61	2	poor	90–190	85–165
1	67	2	good	100–225	90–185
1	53	2	good	110–160	80–130

care and constant observation for at least two years, and in most instances for a much longer period. I have not included any cases with a maximum blood-pressure below 160 millimetres Hg.

before treatment. Most of the cases have had only one course of baths, but seven have had either two or more courses during the years they have been under treatment. It will be noted that of these seventeen cases, most well past middle-age, and all in very bad health when I first saw them, eight are now in good health, six in fair health and able to enjoy life, two are in poor but greatly improved health, and only one, aged seventy-three years, has died. I have little doubt that this patient would have lived much longer if she had taken my advice and had treatment more regularly; she had only two courses in six years, letting five years elapse between the first and last course; her blood-pressure during the last course did not drop below 250 millimetres Hg., and she died about a year later of angina. In all the other cases the blood-pressure was markedly reduced for a long period after treatment.

This record is a remarkable illustration of the value of the 'Nauheim' treatment in cases of arteriosclerosis and high blood-pressure. Undoubtedly, patients with very high tension should always be under observation and take a course regularly if the blood-pressure shows a tendency to rise steadily, and such symptoms as dyspnœa, palpitation, headache, vertigo, or œdema show signs of recurrence.

Many of the painful and dangerous symptoms

which are usually regarded as directly due to hypertension are, in reality, the result of cardiac inadequacy and dilatation, consequent upon that hypertension. If the heart is called upon to work at high pressure for a long period it will first show signs of fatigue and then failure; this failure occurs when the dilatation, which is the result of unchanging inflow and gradually failing outflow, proceeds to such an extent that the tension of the muscular fibres is unable to cope with the increasing intracardial pressure.

Our treatment of such cases should certainly not be the administration of drugs which are *reputed* to lower arterial tension, and which *undoubtedly* act as cardiac depressors, nor by violent purging and starvation diet, which produce a similar result; but by a method which will reduce arterial tension without any depressing effect upon the heart, and so, by relieving it of overstrain, enable it to contract more slowly and more efficiently, and thereby to acquire an improved tonicity which renders it more able to cope with any excessive work thrown upon it, and more fitted to throw off, by the improved circulation, the toxic products which produce increasing hypertension.

Arteriosclerosis does not necessarily affect all persons of advancing age; I have seen many patients between the ages of fifty and seventy who have soft

elastic arteries and low blood-pressure; but there is no doubt that as age advances the tendency to arteriosclerosis increases, and no individual who has not led a careful and abstemious life with regard to eating, drinking, and taking exercise, is at all likely to be free from it after middle age. Even in the most careful lives an hereditary tendency to gout or rheumatism will lead to arteriosclerosis in the long run. Some of the worst cases of arteriosclerosis I have seen have been in middle-aged people who, though strictly temperate as regards alcohol, have always been heavy eaters and taken little exercise.

The difference of the effect of hypertension at varying ages is due to the fact that in older people increased tension is generally the result of a slowly advancing arteriosclerosis, and the heart gradually accustoms itself to the extra strain, and therefore steadily hypertrophies for many years, before it reaches the stage of fatigue and dilatation; whereas, when hypertension is present in the young it is practically always due to some comparatively rapid changes in the circulation setting up a state of irritability and spasmodic contractility in the muscular and elastic walls of the vessels. Such a condition may be brought about by an attack of rheumatic fever, influenza, typhoid, malaria, etc. The heart, in these cases, is suddenly called upon to bear a greatly increased strain, and not having had time to hyper-

trophy, dilatation occurs, accompanied by its train of serious symptoms. When symptoms of heart failure, with high blood-pressure, either in the young or old, are treated with cardiac depressors under the mistaken belief that if the high tension can be lowered the symptoms will be alleviated, it can hardly be wondered at that the results are disappointing both to the physician and the patient.

In cases of hypertension treated by ' Nauheim ' methods, the blood-pressure will gradually drop during treatment, so that, given the improved circulation and more healthy heart's action, which the baths induce, the patient can, with due care to diet, etc., keep this lowered blood-pressure for a long period. The length of time during which these satisfactory conditions will continue depends partly upon the care the patient takes to follow out rules of diet and living, but chiefly upon the condition of the vessel walls, for in those cases where the arterial and capillary degeneration is marked, a second course of treatment will be necessary sooner or later; whereas in those where high tension and cardiac dilatation are due to spasm of healthy vessels brought on by the toxic effects following some acute illness, the patient may never have a relapse, provided that neither the muscular walls of the heart, nor the sino-auricular node, the ventricular node, nor the bundles of Flack and

His, are materially and permanently damaged. Even in cases where the cardiac muscle has been weakened by myocarditis, and the nodes and bundles more or less damaged by inflammation, leading to marked cardiac irregularity, constant premature auricular or ventricular contractions, or partial heart-block, a course of baths will often so improve the nutrition of the cardiac muscle and neuro-muscular tissue that a normal and regular action will gradually replace these unsatisfactory and pathological conditions.

For the purpose of making observations on blood-pressure, I use a Martin's mercurial sphygmomanometer with an armlet, for the maximum reading, in combination with the late Dr. Oliver's tampon and stethoscope, for minimum reading. In visiting cases away from my consulting-room, I always use the convenient pocket-sphygmomanometer invented by the late Dr. George Oliver. The mercurial sphygmomanometer is more accurate and less likely to get out of order than any other form of instrument, and I have not found any form of instrument, without an armlet, to give reliable readings. I have used the terms ' maximum ' and ' minimum ' blood-pressure, in preference to ' systolic ' and ' diastolic,' because I do not believe that the two readings obtained on the sphygmomanometer have any close relationship to the systole

and diastole of the heart. The maximum blood-pressure is indicated by the reading on the sphygmomanometer at the instant when the bruit heard on the stethoscope connected with the tampon ceases; it coincides with the moment at which the lumen of the brachial artery is entirely closed by the pressure of the armlet. The minimum blood-pressure is indicated by the reading on the sphygmomanometer at the instant when a faint bruit is first heard on the stethoscope connected with the tampon; it coincides with the moment when the pressure of the armlet *begins* to flatten the circumference of the brachial artery.

Cases of early arteriosclerosis have some signs in common with commencing chronic Bright's disease, and are sometimes mistaken for Bright's disease. In both instances the blood-pressure is usually high, there is a tendency to headache and œdema, the patient easily tires, and there may be a trace of albumen in the urine. In arteriosclerosis the urine is generally of good colour and fair specific gravity, the heart's impulse is often feeble and the heart-sounds weak, and if the cardiac dulness is increased it is towards the right, indicating auricular dilatation. In the case of Bright's disease the heart's impulse is usually excessive, and if the cardiac dulness is increased it is towards the left, indicating ventricular hypertrophy. Speaking of early Bright's

disease and commencing arteriosclerosis, Clifford Allbutt says:* 'My concern is to point out again that the distinction lies between Bright's disease and another malady, which, if caught in time, is, if not always, yet usually curable, and when incurable abuts upon cardiac defect and apoplexy, and does not at any stage, even of a fatal career, present uræmic symptoms.'

The following three cases are examples of arteriosclerosis and high blood-pressure, treated by the 'Nauheim' methods; they vary greatly from each other, Case I. being complicated with valvular disease, Case II. with a history of alcoholic excess, and Case III. being purely one of arteriosclerosis of old age; they therefore afford good examples of the wide field of use these methods cover with regard to cases of this kind.

Case I.—The patient, a lady aged sixty-seven years, had an attack of influenza a year before I saw her, since which time she had suffered from pains over the region of the heart on the slightest exertion; dyspnœa, which was worse at night and caused her to spend sleepless nights sitting up in bed; severe palpitation; and much distress from cardiac irregularity. She was unable to do anything and had for months led an invalid life. When

* 'Diseases of the Arteries, including Angina.' Clifford Allbutt.

I first saw her her lips were cyanosed and she suffered from marked dyspnœa even whilst sitting in a chair. Her pulse was 84 per minute, and exhibited constant intermittences, which proved to be due to premature auricular contractions (Fig. 35); it was small in volume, the tension was greatly increased, being 125-235 millimetres Hg., and the vessels were tortuous and thickened. There was marked pulsation in the neck, the impulse was very forcible and diffuse, and the apex beat was 1½ inches to the left of the left nipple. The area of cardiac dulness measured 7½ inches across at the nipple level, extending from 1 inch to the right of the middle line, to 1 inch to the left of the left nipple (Fig. 40, *AA*). The heart-sounds were accentuated, a loud systolic murmur was heard over the mitral area, and both systolic and diastolic murmurs were heard over the aortic area; the legs and ankles were œdematous; and the urine was of specific gravity 1015, but contained no albumen, sugar, or casts. As the patient had had treatment by rest and drugs for many months and was not improving in health, I advised her to take a course of ' Nauheim ' baths, and took her into a nursing-home for that purpose, as she was too ill to be treated in her own house. Fig. 35 is a polygraphic tracing taken before the first bath; it shows two examples of the frequent premature auricular contractions, the auricular

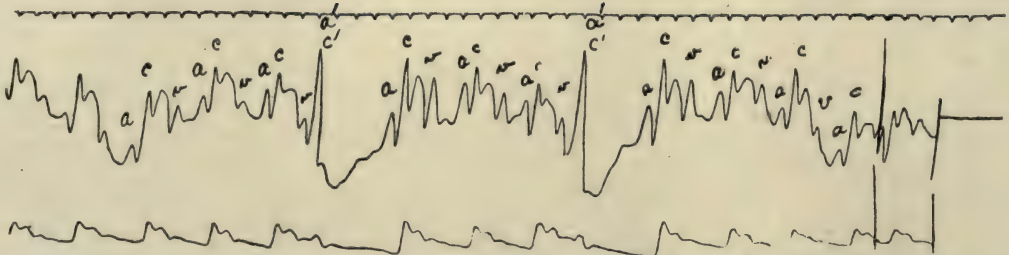

FIG. 35.—POLYGRAPHIC TRACING OF CASE I. BEFORE COURSE, SHOWING FREQUENT PREMATURE AURICULAR CONTRACTIONS; PULSE 84 PER MINUTE.

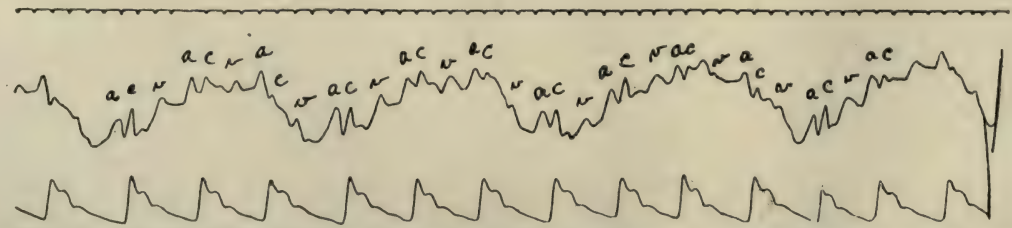

FIG. 36.—POLYGRAPHIC TRACING OF CASE I. AFTER FIRST BATH, SHOWING REGULAR PULSE OF IMPROVED VOLUME; PULSE-RATE 75.

and ventricular contractions occurring simultaneously; the pulse-rate is 84 per minute, and the volume of the pulse is rather small. Fig. 36 is a polygraphic tracing taken ten minutes after the first bath; it shows a regular pulse of improved volume and slower rate, 75 per minute; there is slight sinus arrhythmia.

After a course of twenty-five baths, extending over five weeks, the patient was in a much better state of health; she had no dyspnœa and could sleep well without any pain, palpitation, or orthopnœa; there was no œdema of the legs or ankles; and the maximum blood-pressure had fallen 35 millimetres Hg., the readings on the sphygmomanometer being 120-200 millimetres Hg. The area of cardiac dulness had decreased by $2\frac{1}{2}$ inches, measuring 5 inches across at the nipple level and extending from the middle-line to $\frac{1}{2}$ inch inside the left nipple line, the apex beat was in the nipple-line, and the cardiac impulse was much less forcible and diffuse (Fig. 40, *BB*). Fig. 37 is a polygraphic tracing taken at the end of the course; it shows a regular pulse of fair volume, 68 per minute. Nine months after treatment this patient was still enjoying good health and her pulse was quite regular (Fig. 38); the rate was still keeping well down, being 68 per minute, but the volume had slightly decreased.

This patient has now been under my care for

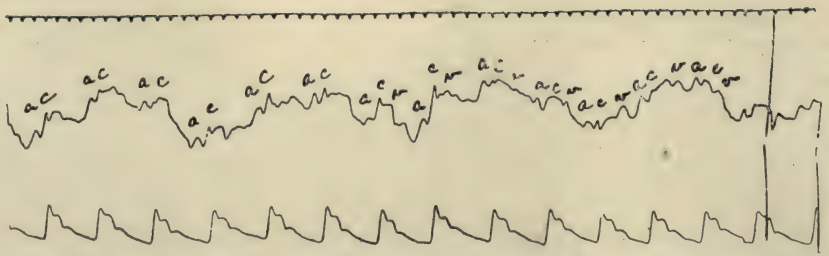

FIG. 37.—POLYGRAPHIC TRACING OF CASE I. AFTER COURSE, SHOWING REGULAR PULSE OF GOOD VOLUME; RATE 68.

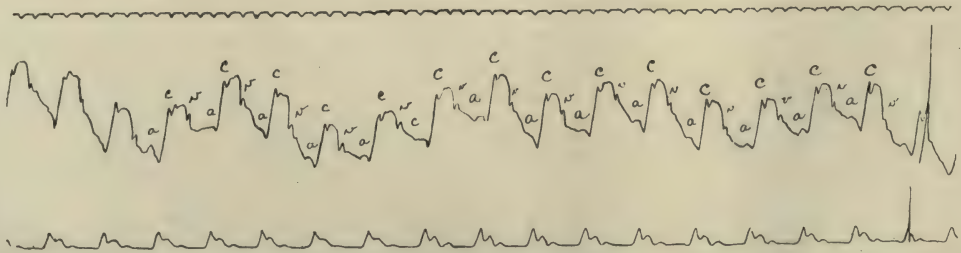

FIG. 38.—POLYGRAPHIC TRACING OF CASE I., NINE MONTHS AFTER COURSE, SHOWING REGULAR PULSE; RATE 68 PER MINUTE.

(Both v^1 and v^2 are present in this tracing, but only v^2 is indicated in order to simplify the lettering.)

seven years, during which time she has had seven courses of baths, with one year's interval between each course. After each course she remains well for about nine or ten months, then symptoms of dyspnœa, pain, and palpitation begin to develop; she sleeps badly, has headaches, and is only able to walk a short distance, and the area of cardiac dulness tends to increase. For these reasons she takes another course, and her symptoms disappear and she keeps in good health for about a year. This history is typical of the patient of advancing age whose vessel-walls are markedly atheromatous, whose cardiac valves are defective, and whose blood-pressure is very high. I am

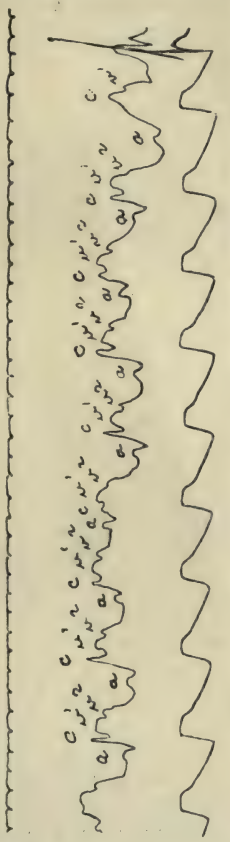

FIG. 39.—POLYGRAPHIC TRACING OF CASE I., ONE YEAR AFTER SIXTH COURSE OF BATHS. THE BLUNT TOP TO THE RADIAL PULSE TRACING IS DUE TO THE PEN HAVING TO BE KEPT FIRMLY PRESSED ON THE PAPER IN ORDER TO MAKE IT MARK.

convinced that this patient would have died some years ago from cardiac failure, the result of hypertension and defective valves, if she had not taken

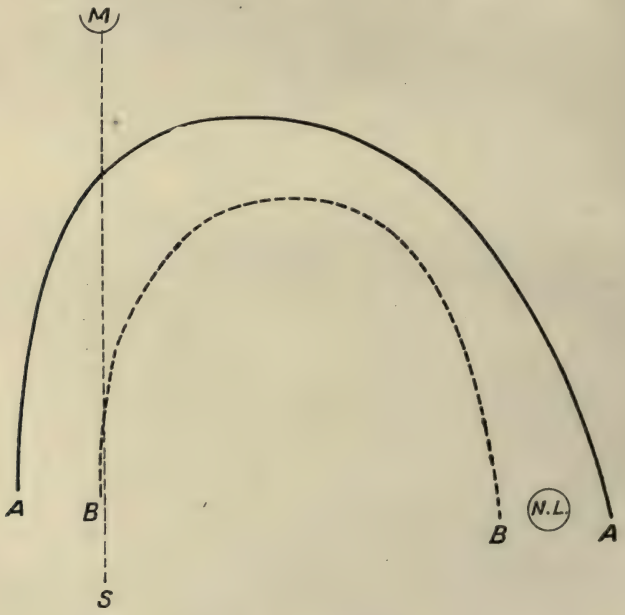

FIG. 40.—CASE I.

AA, area of absolute cardiac dulness before treatment; *BB*, area of absolute cardiac dulness after treatment; *MS*, mid-sternum; *LN*, left nipple.

regular treatment as she has done, and is consequently alive and in a state of health in which she can enjoy her life. Ever since the first course of

baths the pulse has remained regular. She is now seventy-four years of age.

CASE II.—The patient, a man aged sixty-three years, was of a gouty constitution, and had been

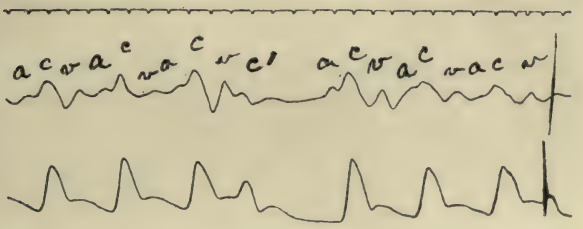

FIG. 41.—POLYGRAPHIC TRACING OF CASE II., BEFORE TREATMENT, SHOWING AN EXAMPLE OF PREMATURE VENTRICULAR CONTRACTION (*c'*).

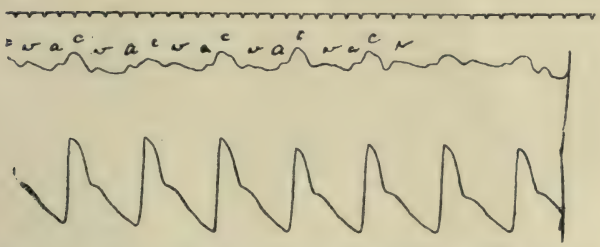

FIG. 42.—POLYGRAPHIC TRACING OF CASE II., AFTER TREATMENT, SHOWING REGULAR PULSE OF BETTER VOLUME AND SLOWER TIME, 60 PER MINUTE.

used to a large quantity of alcohol. He had a bad attack of influenza fifteen months before I saw him, and had been failing in health ever since. For

nine months he had suffered from severe asthma and bronchitis, and had been kept to bed and a bath-chair; he had, in fact, been told to buy a bath-chair and a carrying chair, and that there was little chance of his being well enough to walk again. When I first saw the patient he looked ill, and was very cyanosed and short of breath; said he could neither eat nor sleep, having to be propped up at night, and suffered greatly from depression and cardiac asthma He was puffy under the eyes, the pulse was 108 per minute and exhibited constant irregularities, the result of premature ventricular contractions (Fig. 41). The heart was very dilated, the area of absolute cardiac dulness measuring 6½ inches across at the nipple level and extending 2 inches to the right of the middle-line, the apex-beat was just in the left nipple-line, and the heart-sounds were very feeble (Fig. 43, *AA*). The arteries were thickened and tortuous, the blood-pressure was 80-150 millimetres Hg., and his liver dulness extended from 2 inches above the normal level to an inch below the costal arch. I gave this patient a course of twenty-five ' Nauheim ' baths extending over a period of five weeks. After three weeks' treatment, he was so much improved that he could walk from a mile to a mile and a half, and therefore sold his bath-chair and carrying chair. At the end of the treatment he slept and ate well, had no dyspnœa or

orthopnœa, and could walk two or three miles with comfort. His heart-sounds were much stronger, his cardiac dulness was normal, extending from

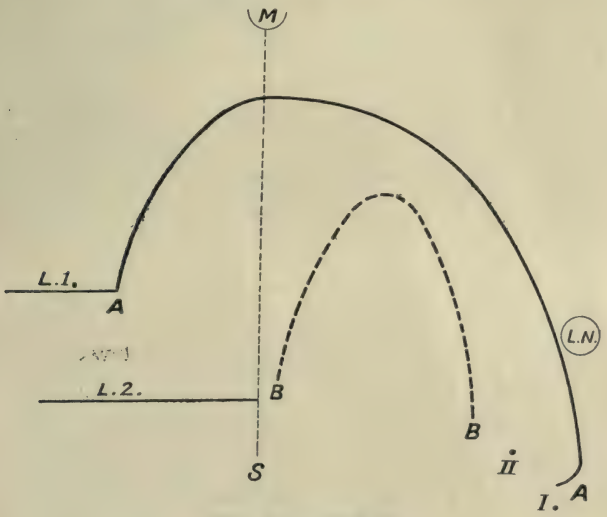

FIG. 43.—CASE II.

AA, area of absolute cardiac dulness before treatment; *I*, apex-beat; *L*1, upper border of liver dulness; *BB*, area of absolute cardiac dulness after treatment; *II*, apex-beat; *L*2, upper border of liver dulness; *MS*, mid-sternum; *LN*, left nipple.

1½ inches inside the left nipple to the left border of the sternum; the apex-beat was 1 inch inside the left nipple-line, and the liver dulness had decreased by 2 inches (Fig. 43, *BB*) The pulse was

of better volume and perfectly regular in time, 60 per minute (Fig. 42), and the blood-pressure had fallen to 70-125 millimetres Hg.

A month after treatment, this patient went to Australia, his native country, and wrote home from there, just a year after treatment, to tell me he was perfectly well, and able to enjoy long walks. Four years after treatment he wrote from New South Wales to me: ' I am very well, no return of asthma or heart troubles since you treated me. I take plenty of exercise, go for long walks and sleep well, and have not needed any medical advice since I saw you.'

CASE III.—A man, aged seventy-nine, was sent to me by the late Dr. Gabbett, of Ottery St. Mary. He had been failing in general health for twelve months, his blood-pressure was raised, 90-175 millimetres Hg., his arteries were thickened and somewhat tortuous, his heart-sounds were very feeble, and his cardiac dulness was markedly enlarged on the right side, extending to 2 inches beyond the right border of the sternum (Fig. 46, *AA*), the apex-beat could not be felt. His pulse was very intermittent and irregular in volume. A polygraphic tracing (Fig. 44) shows that the irregularity of the pulse was due to frequent premature ventricular contractions (*c'*).

I gave the patient a course of ' Nauheim ' baths, at the end of which course the cardiac dulness was normal, the dulness on the right side being well to

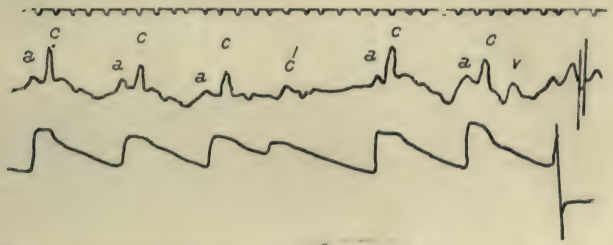

FIG. 44.—POLYGRAPHIC TRACING OF CASE III., BEFORE TREATMENT, SHOWING AN EXAMPLE OF THE FREQUENT PREMATURE VENTRICULAR CONTRACTIONS MARKED *c'*.

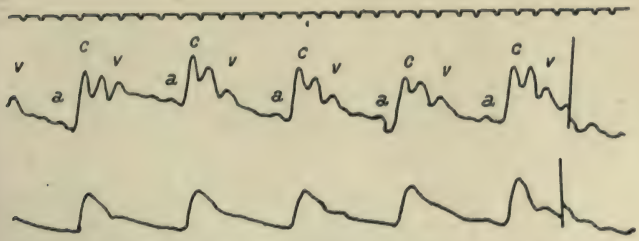

FIG. 45.—POLYGRAPHIC TRACING OF CASE III., SHOWING REGULAR PULSE, WHICH INDICATES IMPROVED CARDIAC CONDUCTIVITY.

the left of the middle-line (Fig. 46, *BB*); and the premature ventricular contractions were much less frequent, the pulse being quite regular, both in

time and volume, for long periods (Fig. 45). The patient is now in his eighty-fourth year and enjoys good health.

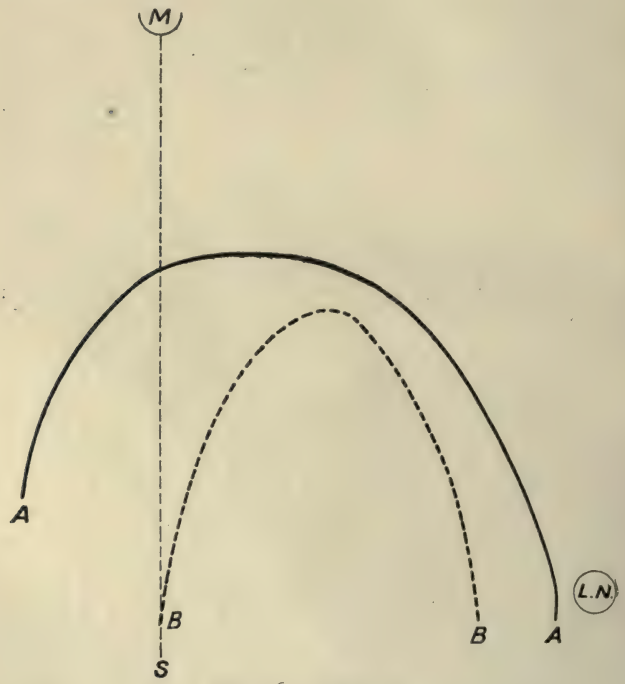

FIG. 46.—CASE III.

AA, area of absolute cardiac dulness before treatment; *BB*, area of absolute cardiac dulness after treatment; *MS*, mid-sternum; *LN*, left nipple.

CHAPTER IV

ANGINA PECTORIS

Up to the present time, the treatment of angina pectoris by drugs, rest, and dieting has been far from satisfactory, and a case in which this dangerous and painful condition has been diagnosed, is generally looked upon as one which will end with a fatal result sooner or later, and in which little more than palliative treatment can be adopted. Undoubtedly a very quiet life, great care in dietary, avoidance of all exertion, and the careful administration of such drugs as the iodide group, nitrites, etc., are of material help, especially if the treatment can be started and adhered to when the attacks are comparatively slight and of short duration. It is, however, unfortunately, almost impossible to get patients to realize the seriousness of this symptom in its beginnings, or the importance of observing the very strict and burdensome rules of life and diet which are necessary to keep it in check.

Many theories have been brought forward to explain the cause of angina pectoris, and it would

take much space to discuss them all; indeed, such a proceeding would be out of place in a short paper which only presumes to deal with facts definitely connected with the practical treatment of this condition. Of the theories propounded up to the present, that of Sir Clifford Allbutt,* which he supports with much minute detail of post-mortem examinations, seems to me to be the correct one up to a certain point, but it does not account for the paroxysmal nature of the attacks. He is of opinion that angina is always due to aortitis.

That aortitis is practically always present in cases of angina pectoris, does not, however, explain the paroxysmal nature of the attacks, and one feels that there must be some superimposed phenomenon which is the actual cause of the paroxysms. The presence of aortitis of the first part of the aorta, causing narrowing of the orifices of the coronary arteries, would lead to a defective flow of blood along these vessels. In a case in which this condition is present, any irritation, such as unusual exertion or the pressure of a distended stomach, might act upon the contracted, chronically inflamed and hypersensitive orifices of the coronary arteries and cause a spasmodic contraction of those vessels, so that, for the time being, the cardiac tissues supplied by

* 'Diseases of the Arteries, including Angina Pectoris.' Sir Clifford Allbutt.

them would be cut off from the general blood-current, and a condition somewhat resembling 'dead fingers' would be produced in the cardiac muscles. It is not only possible, but almost certain, that a condition of this kind, occurring suddenly, would be quite sufficient to cause the pain, difficulty of breathing, and other alarming symptoms which constitute a paroxysm of angina. The fact that the vaso-dilatatory effects of the inhalation of amyl nitrite give almost instant relief in most cases, goes far to support this theory as to the causation of the actual paroxysm of angina; whereas the mere presence of aortitis would not account for the paroxysmal nature of the attacks, nor for the rapid relief obtained from the inhalation of amyl nitrite.

A very high blood-pressure and arteriosclerosis are not a necessary, or usual, accompaniment of angina; in fact, it is rare to find angina in cases of very advanced arteriosclerosis. One would expect this to be the case if anginal attacks are due to spasmodic contraction of the coronary arteries, as I believe they are, for we should not expect such attacks in cases in which the vessels have become more or less rigid from arteriosclerosis, they being less elastic and, therefore, less liable to spasmodic contraction. Sir Clifford Allbutt says* that the

* 'Diseases of the Arteries, including Angina Pectoris.' Sir Clifford Allbutt.

coronary arteries are often quite free from disease in cases of death from angina, and Dr. B. H. Spilsbury* has noted that interference with the coronary circulation followed by sudden death may result from disease of the first part of the aorta, frequently syphilitic aortitis, causing narrowing of the orifices of the coronary arteries, the vessels being otherwise free from disease. From the evidence obtainable it would seem, therefore, that angina usually attacks patients who suffer from aortitis and whose coronary arteries are, in most cases, healthy except at their orifices. As something beyond the persistent aortitis is necessary to account for the actual spasm of attack, it is a workable theory that this spasm is due to irritation of chronically inflamed coronary orifices generating spasmodic contraction of the elastic and muscular tissue along their entire course. I would suggest the following as a definition of angina pectoris : *Angina pectoris may be defined as a sudden attack of pain arising over the sternum and cardiac region, due to spasmodic contraction of the coronary arteries, the result of inflammation of the first part of the aorta.*

I do not propose to discuss the treatment of angina by drugs, rest, or special rules of life, for these methods have been dealt with fully by many writers

* ' Sudden Death.' Dr. B. H. Spilsbury, *The Practitioner.*

on the subject. In this country, however, balneological treatment has not received the attention which it merits, both on account of the very highly satisfactory results obtained from its use, and because it can be applied in a nursing-home or the patient's own house. Equally good results can be obtained as at any spa, English or foreign, if sufficient care and trouble are taken with regard to the minute details of treatment; though a certain amount of experience is necessary in its administration.

One of the reasons why this method of treatment has been somewhat neglected in England is found in the attitude taken with regard to it by some writers upon the subjects of cardiac and arterial diseases. A typical example of this attitude is found in Sir Clifford Allbutt's book upon 'Diseases of the Arteries, including Angina Pectoris.' After giving an account of the successful treatment of arteriosclerotic patients at Nauheim by the late Doctor Groedel, he says: 'In England, where bathing is generally left to attendants, these scientific niceties are not observed; it is better, therefore, in this country to treat arteriosclerotic patients, whether hyperpietic or decrescent, by other methods.' Because a good treatment is given improperly by some, seems to me a very poor argument in favour of abandoning its use, more especially as it is within the power of any physician, who will take the trouble,

to make all the scientific observations which are necessary for the satisfactory carrying out of the treatment. As it will now be impossible for any physician to send his patients to Germany, this seems to me a splendid opportunity for the more general application of scientific methods to balneological treatment in England. In the past, many physicians in this country have advised their patients to go to foreign spas for baths and other forms of treatment. One cannot help feeling that, if they had given their time and skill to the scientific improvement of English balneological methods, they would have done as well for their patients and better for their country, for there is no doubt that scientific balneology has been much neglected by many of the heads of our profession in England up to the present.

There are very few cases of angina pectoris that will not derive benefit from a course of properly administered ' Nauheim ' baths, and I have found in several instances, in which the treatment by drugs, rest, and dietary, produced little improvement, that a course of baths has either abolished attacks for a long period, or rendered them less frequent and less severe. A great mistake that is often made, is leaving balneological treatment as a last resource, when all other methods have been tried in vain, when the patient's condition is gradually deterio-

rating, and his strength is sapped by repeated attacks of angina and the ever-present fear of recurrent spasms. Even in severe cases of long standing I have obtained great improvement; in one, that of a patient who used forty to sixty capsules of amyl nitrite daily before I saw him, the frequency and severity of attacks greatly decreased during treatment, and two months after the course was complete, he was absolutely free from them (Case V.).

In the balneological treatment of cases of cardiac and circulatory diseases, the baths must be given under the personal supervision of the medical man, and their effect upon the volume, rate, and regularity of the pulse must be carefully noted during immersion, at least twice a week. The administration of baths should never be left entirely to an attendant or nurse, however skilled that attendant may be, for it is only by carefully watching their effect upon the heart and circulation in each individual case, that those which produce the best results can be given, and a bath which is suitable for one case is quite unsuitable for another. A patient suffering from angina should never have to make a daily journey to a nursing-home or bath establishment for the purpose of taking baths, but he should always be resident in the nursing-home or be given the treatment in his own home,

hotel, or lodgings, so that he may be able to get straight out of bed into the bath and back from the bath to bed, for the necessary hour's rest, without involving the exertion required in the undressing and dressing which is unavoidable if he does not reside on the spot where the baths are given. The usual proceeding observed at many watering-places —the getting up, dressing, proceeding to the bath-house, undressing, bathing, reclining on a couch for a time, dressing again and returning home—is a very great strain upon cases of this kind, and to give treatment under such circumstances is to minimize materially the benefit which would be obtained from a course given under more satisfactory conditions. It is quite suitable for the gouty or rheumatic patient to have to make a certain amount of effort in following out his bath course; in fact, it does him good to do this, and is, no doubt, a useful part of the treatment, especially in the full-blooded and overfed type. But in the case of those suffering from angina or cardiac disease, the reverse holds good.

The dilatation of all the cutaneous capillaries produced by immersion in a 'Nauheim' bath, may be likened somewhat to the effect of the inhalation of amyl nitrite, with these differences. The capillary dilatation is slower and more general in production, does not produce any unpleasant sensation

of fulness or headache, and is very much more lasting than that of the drug. This dilatation causes a fall of blood-pressure and relieves any condition of contractile spasm present in the vessels, thereby lessening the resistance to be overcome by cardiac contraction, so that the heart is enabled to do its work quite satisfactorily with a decidedly slower beat than was required before immersion, and consequently, a sedative and anti-spasmodic condition of circulation is established. This condition continues for some time after the bath, and is more pronounced and more enduring after each succeeding bath. The lowered blood-pressure, the dilated capillaries, and the improved cardiac contraction, all tend to a decided improvement in the circulation. Those parts of the circulatory system, which are specially involved in angina, namely, the first part of the aorta, the coronary vessels, and the cardiac muscles, all share in this improved condition, and are better nourished and, therefore, better able to withstand any tendency to degenerative process, which is affecting them. As the degenerated tissues are supplied with a better oxygenated blood-flow, they gradually tend to become more healthy and to throw off any inflammatory condition due to malnutrition or toxic poisoning. The patient's health may, therefore, be expected to go on improving for some months after the course is finished; these nutritive

changes, indeed, are necessarily slow, so that one must not be disappointed if the improvement during the course is not very rapid. Personally, I have never treated a case of angina which has not shown material and steady improvement both during the course as well as for some months after it.

With regard to the presence of cardiac dilatation in anginal cases, I have not found it to exist to any great extent in the majority, though in some, definite cardiac dilatation has been present and has complicated and intensified the condition. Valvular disease is not a necessary complication in these cases; if, however, cardiac dilatation or valvular disease is present, balneological treatment is not counter-indicated, but is, on the contrary, specially beneficial, more particularly in cases of cardiac dilatation.

The following three cases are typical examples of angina treated by balneological methods. In each, treatment by drugs, rest, dietary, and careful rules of life, had been tried for some time with no definite success, but soon after beginning a course of baths they improved, and continued to do so steadily. I have found this to be the rule in most cases I have treated.

CASE IV.—The patient, a lady aged sixty years, had a severe attack of influenza thirteen months

before she consulted me, since when she had had to lead an invalid life, spending her time between the couch and bed, and suffering from anginal pains on the slightest exertion. These pains often occurred several times in the day, and on more than one occasion the severity of the pain caused her to faint. When I first saw her, the heart's action was very irregular and the pulse very feeble, 96 per minute

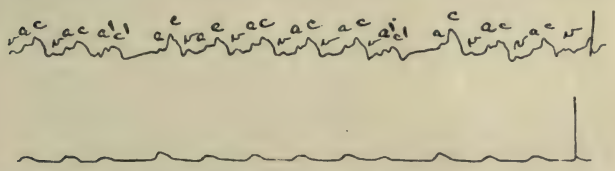

FIG. 47.—POLYGRAPHIC TRACING OF CASE IV., BEFORE TREATMENT, SHOWING TWO EXAMPLES OF THE CONSTANT PREMATURE AURICULAR CONTRACTIONS, *a'c'*, AND A PULSE OF VERY SMALL VOLUME.

in the recumbent position; the irregularities were caused by constant premature auricular contractions (Fig. 47).

On auscultation, the second sound over the aortic base was very slapping and bell-like in tone, there was no indication of decided cardiac dilatation, and the apex-beat was in the nipple-line. The vessels showed slight arteriosclerotic changes, the minimum blood-pressure was 95 millimetres Hg.,

and the maximum 160 millimetres Hg.; the urine was normal. I treated her with absolute rest, a careful dietary, and a mixture containing liquor trinitrini and tincture of strophanthus, as I have found this combination to produce the best results in these cases. She improved somewhat but not to any great extent, any slight exertion still bringing on the anginal attacks, which necessitated the use of two or three capsules of amyl nitrite daily. I then advised a course of ' Nauheim ' baths and resistance-exercises, but before giving them I took her to Dr. Arthur P. Luff; he agreed with me that the case was a suitable one for the treatment, but suggested the trial of a course of iodides first. These, however, did not suit her, for she got worse under them, and had a bad attack of syncope, so I started a course of ' Nauheim ' treatment after consultation with Dr. Luff. For the first eight days the baths were not given because she was not strong enough to take them, but I gave her a few of the resistance-exercises daily. The strength and regularity of the pulse were so improved by these exercises, that I was able to start the baths on the ninth day. Henceforward, baths were given on Mondays, Tuesdays, Thursdays, Fridays, and Saturdays, the exercises on Wednesdays, and the Sundays were rest-days. She took a course of twenty-five baths extending over five weeks, and

began to improve from the first onward; the severity and frequency of the attacks lessened, and the pulse became quite regular in time, after the first fortnight, and much larger in volume. At the end of the treatment, the anginal attacks were very slight and occurred only once or twice a week instead of three or four times a day, the pulse was quite regular in time and of good volume (Fig. 48). The blood-

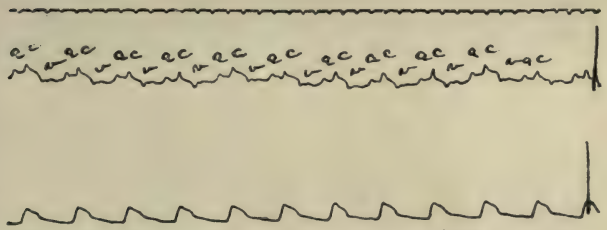

FIG. 48.—POLYGRAPHIC TRACING OF CASE IV., AFTER TREATMENT, SHOWING AN ABSOLUTELY REGULAR PULSE OF BETTER VOLUME.

pressure was 80-145 millimetres Hg., a drop of 15 millimetres Hg. in both the maximum and minimum pressures, and she was able to be up and about and enjoy short walks.

Three months after treatment she was better in every way and could walk about two miles and enjoy life. The pulse was of still better volume, quite regular and of slower rate, 79 per minute (Fig. 49). The second sound over the aortic area was much

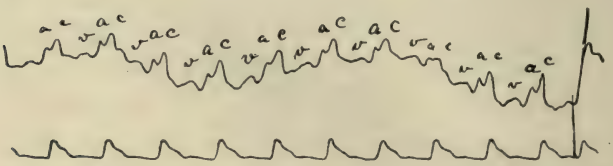

FIG. 49.—POLYGRAPHIC TRACING OF CASE IV., THREE MONTHS AFTER TREATMENT, SHOWING PULSE OF STEADILY IMPROVING VOLUME AND SLOWER RATE, 79 PER MINUTE.

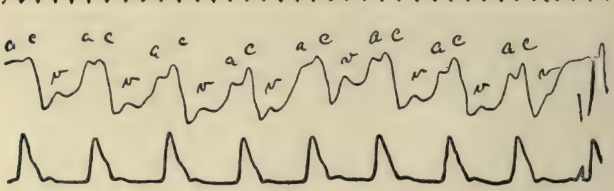

FIG. 49*a*.—POLYGRAPHIC TRACING OF CASE IV., TEN MONTHS AFTER TREATMENT, SHOWING PULSE OF VERY GOOD VOLUME AND SLOWER RATE, 76 PER MINUTE.

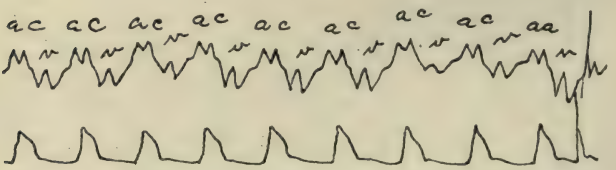

FIG. 50.—POLYGRAPHIC TRACING OF CASE IV., FIFTEEN MONTHS AFTER TREATMENT, SHOWING REGULAR PULSE OF GOOD VOLUME, 68 PER MINUTE.

less slapping and the bell-like tone was no longer present. Ten months after treatment she was still in better health and the pulse was stronger and slower (Fig. 49*a*). Fifteen months after treatment she was still in very good health and had no pain, and the pulse was of good volume, 68 per minute (Fig. 50).

CASE V.—The patient, a man aged forty-one years, was brought to me by Dr. Johns of Bournemouth. The history of the case is as follows: Two years previously he was suddenly seized with violent pains in the left side of the chest and left arm, accompanied by severe shortness of breath. These attacks increased in severity and frequency, despite various forms of treatment, and for over a year he had been an absolute invalid, unable to do anything for fear of bringing on an attack. He could scarcely eat anything, had very broken nights on account of the frequent recurrence of these attacks, and had lost a good deal of weight. The only treatment that alleviated the attacks was the use of amyl nitrite capsules, of which he was using forty to fifty in the twenty-four hours, his attacks of pain coming on about every half-hour. No definite cause could be discovered for his condition, except that he had been a fairly heavy drinker for years.

When Dr. Johns first brought him to see me, he

looked very ill, was very anæmic and cyanosed, and suffered from dyspnœa, even whilst sitting still. He was very thin, and though a tall man, only weighed 9 stone 7 pounds. His pulse was 100 per minute, a typical pulse of aortic regurgitation, violent pulsation could be seen in the neck and in all vessels near the surface, and his whole arm pulsated with each heart-beat; his blood-pressure was 40-190 millimetres Hg.

On examination of the chest, the impulse was seen to be general over the whole of the left front, and at the apex, 2 inches outside the left nipple-line, it was very forcible and diffuse; the area of absolute cardiac dulness was exceedingly large, extending for $2\frac{1}{2}$ inches to the right of the sternum to 2 inches to the left of the left nipple, and measuring 8 inches across on the nipple level (Fig. 51, *AA*). On auscultation, a loud double murmur could be heard over the aortic area, and a strong blowing systolic over the apex, conveyed into the axilla. He had two attacks of angina whilst in my consulting-room. On each occasion he became very white, the dyspnœa was greatly increased, and the symptoms were not relieved till he had used a capsule of nitrite of amyl. He was undoubtedly suffering from a greatly dilated and hypertrophied heart, accompanied by double aortic disease, mitral regurgitation, and frequent attacks of angina pectoris. A polygraphic tracing

of his pulse showed a rapid pulse, 93 per minute, and a decidedly increased *A—C* interval, indicating impaired cardiac conductivity (Fig. 52). The rounded apex to the radial pulse tracing was caused by the

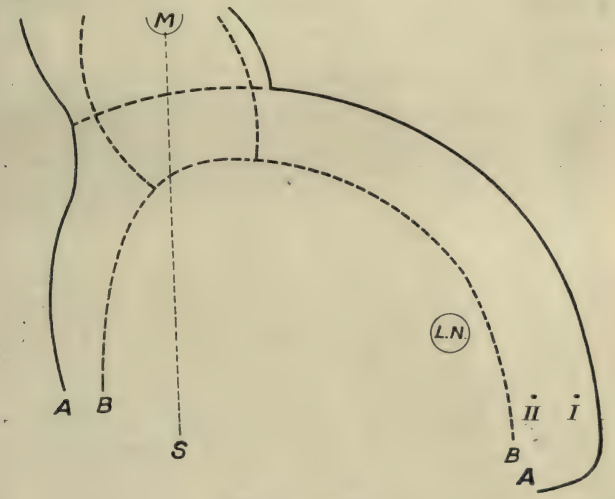

FIG. 51.—CASE V.

AA, area of cardiac dulness before treatment; *I*, apex-beat; *BB*, area of cardiac dulness after treatment; *II*, apex-beat; *MS*, mid-sternum; *LN*, left nipple.

The increased area of dulness over the base of the aorta before treatment showed definite aortic dilatation.

necessity of pressing the pen heavily upon the paper in order to prevent the whole breadth being taken up by the violent movement of the radial curve.

I explained to the patient that a course of 'Nau-

heim' baths would most likely do him good, as anginal cases had been alleviated by them. I advised him to try them, for it was his last chance of relief, all other treatments having failed, but I pointed out that they would not cure him entirely, and that the benefit so severe a case as his would get from the treatment was uncertain. He decided, however, to try a course, for he said that if he went

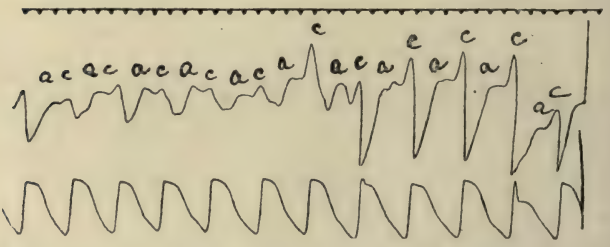

FIG. 52.—POLYGRAPHIC TRACING OF CASE V., BEFORE TREATMENT, SHOWING DECIDEDLY INCREASED *a-c* INTERVAL; PULSE 88 PER MINUTE.

on very long as he was the pain and the insomnia would kill him. He started a course of baths, at which time he was using from forty to sixty capsules of amyl nitrite in the twenty-four hours. He began to improve from the first, the attacks of angina decreasing in number and severity; after ten days' treatment, during which time he had had eight baths, he was only using sixteen to twenty capsules in the twenty-four hours. After nineteen baths,

extending over a period of twenty-five days, he was sleeping and eating well, had put on 1 stone 3 pounds in weight, his weight being 10 stone 10 pounds, and he seldom used a capsule of amyl nitrite during the day, but still used from six to eight during the night. His pulse was slower, 78 per minute, and the *A*—*C* interval was normal (Fig. 53).

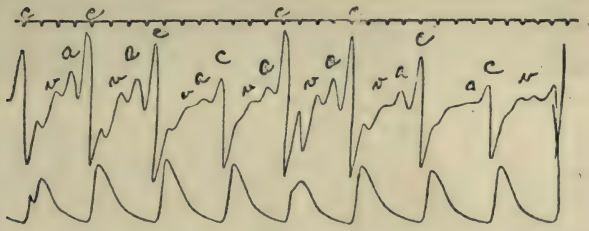

FIG. 53.—POLYGRAPHIC TRACING OF CASE V., AFTER TREATMENT, SHOWING SLOWER PULSE AND NORMAL *a-c* INTERVAL.

The cardiac dulness was decidedly less, measuring 6 inches across at the level of the nipple, and extended from 1 inch to the right of the sternum to 1 inch to the left of the left nipple; the apex-beat had come in as well, and was 1 inch outside the nipple-line (Fig. 51, *BB*). Both the pulsation and the murmurs were much reduced in strength, and the maximum blood-pressure was only 145 millimetres Hg.

Two months after the patient had returned home,

Dr. Johns wrote to me to say that he was very much better, and had given up taking amyl nitrite, as he never had an attack of angina. Two months later he again wrote, as follows: ' Still more wonderful reports of our patient B——. He has now put on 2 stone in weight, sleeps well, eats well, has no pain, and the murmurs have changed in character, being much softer.' This patient was so seriously ill when I first saw him that I hardly expected the treatment to have so highly satisfactory a result.

CASE VI.—The patient, a single lady, aged fifty-eight years, suffered from ' heart-strain ' ten years before I saw her. She was laid up for six weeks and could only walk a short distance for some months afterwards, on account of pain, intermittent heart's action, and shortness of breath. Two years later she developed anginal attacks, and continued to have them three or four times a year, till three months before she saw me, when she had a severe attack of influenza, since which she had had anginal attacks about every month. The attacks lasted about half an hour, and she was laid up for some days after each with collapse. When I first saw her, her hands showed the typical deformities of rheumatoid arthritis, her vessels were somewhat sclerotic, she was rather cyanosed, exceedingly thin, and could not take any exercise on account of weakness. The area of cardiac dulness extended from the right

border of the sternum to half an inch outside the left nipple-line, indicating definite cardiac dilatation, the impulse was very feeble, the blood-pressure was 90-140 millimetres Hg., and her pulse was regular in time, 100 per minute, and of small volume (Fig. 54).

I treated her for three months with drugs, careful rules of life, and dietary, and her health improved to a certain extent, but at the end of this period

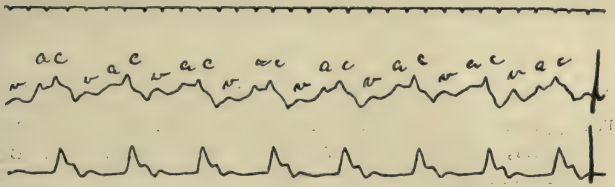

FIG. 54.—POLYGRAPHIC TRACING OF CASE VI., BEFORE TREATMENT, SHOWING PULSE OF SMALL VOLUME.

she had a severe anginal attack which laid her up for some days, so I started a course of ' Nauheim ' baths. A month after treatment she could walk a mile comfortably and had not had an anginal attack, the pulse was much stronger in volume and slower in rate, 75 per minute (Fig. 55).

The area of cardiac dulness extended from an inch inside the left nipple-line to the left border of the sternum, and the apex-beat was 1 inch inside the nipple-line, the impulse being much stronger than before treatment. Six months later she had a severe

attack of influenza but no angina pectoris, and nine months after treatment she had had no recurrence of attacks and felt quite well. Eighteen months after treatment the patient was in perfectly good health, her blood-pressure was 80-135 millimetres Hg., and she had had no more anginal attacks.

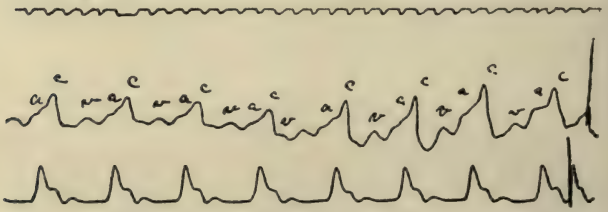

FIG. 55.—POLYGRAPHIC TRACING OF CASE VI., AFTER TREATMENT, SHOWING IMPROVED VOLUME AND SLOWER RATE OF PULSE, 75 PER MINUTE.

I have auscultated many hearts with Bock's stethoscope, but find that I can hear any decidedly exaggerated sound when the instrument is entirely closed and the pointer indicates 100, so I have given up the use of this instrument for estimating the intensity of heart-sounds.

CHAPTER V

VALVULAR DISEASE AND FATTY HEART

From the time of the introduction of the stethoscope to the invention of the sphygmomanometer, valvular disease held by far the most important position amongst diseases of the heart and circulation. When the attention of the medical profession was drawn to the importance of blood-pressure records, those who studied the subject carefully soon discovered that chronic cardiac dilatation and hypertension often accompanied valvular disease, and that most of the serious symptoms were due to the failure of the muscular walls of the heart to combat the hypertension, and not directly to the valvular disease. The teaching that the valvular defect was the direct cause of the symptoms, and that, that defect being incurable, the symptoms were also incurable, and therefore nothing could be done for such cases except treatment by rest and cardiac tonics, has been in vogue for so long a period that some medical men are still under the mistaken impression that the 'Nauheim' treatment is of

no use in cases of valvular disease. Although it is true that no treatment whatever will cure valvular disease, yet the symptoms which are the outcome of the failure of the heart muscle to struggle against the excessive strain put upon it by a faulty valve and by hypertension, can very often be cured for a long period by a course of ' Nauheim ' baths.

I have successfully treated a large number of patients suffering from various forms of valvular disease, and complaining of such symptoms as palpitation, dyspnœa, dyspepsia, and general ill-health, and showing signs of cyanosis and œdema. These cases always suffer from cardiac dilatation to a greater or less extent. It is clearly evident that such dilatation would increase any failure of apposition of the cardiac valves, and that if the dilatation can be cured the condition of the patient would be greatly improved, for not only is the valvular defect reduced to a minimum, but the muscular walls of the heart recover tone and are more able to cope with the extra work which is thrown upon them.

The following cases are typical of this class, and the great improvement in their condition, following a course of treatment, is the usual result in such cases, provided they have not been left till the last stage of cardiac failure is well established. To treat these chronic cases by no other method

than the administration of digitalis and allied cardiac tonics, may be likened to whipping up a tired horse, and a time will come when there will be no response to the stimulation of the whip. The only treatment that produces any lasting improvement is the relief of the strain, by dilatation of the entire capillary circulation, so that the heart's work is lessened and it can have the opportunity of contracting satisfactorily and regaining tone and strength; this opportunity is afforded by a course of 'Nauheim' baths.

Case VII.—The patient, a man aged fifty-seven years, was sent to me by Dr. W. H. Gregory of Beverley, who informed me that he was suffering from mitral regurgitation, cardiac dilatation, and muscle failure. He had been confined to his bed for eight weeks on account of palpitation, dyspnœa, insomnia, general weakness, and very intermittent pulse, and had improved to a certain extent, but for some time had been at a standstill. The patient had had rheumatic fever, accompanied by pericarditis and endocarditis, when he was fourteen years of age. When I first saw him, he was very thin and weak, and could not walk many steps without having to sit down; he was distinctly cyanosed, and dyspnœa was present on slight exertion. His pulse was very small, and exhibited premature auricular contractions (Fig. 57); and he was unable to sleep

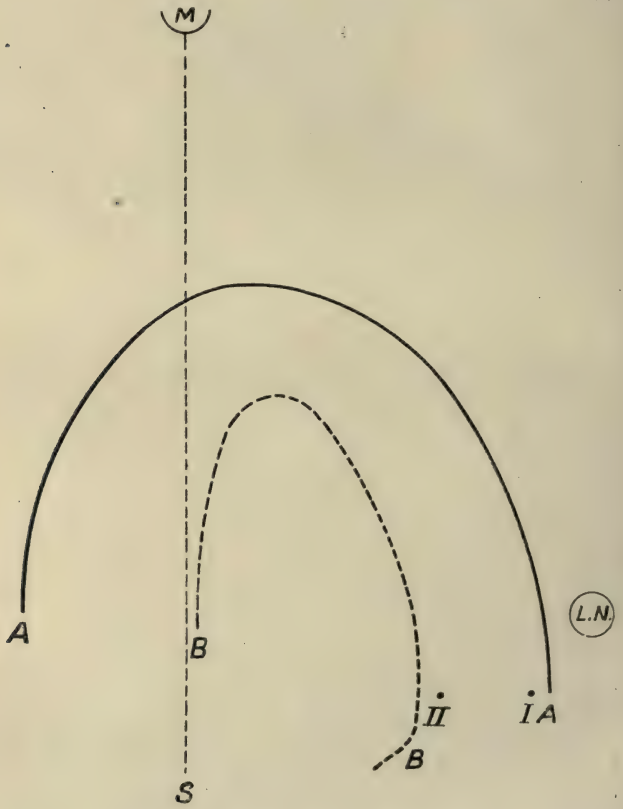

FIG. 56.—CASE VII.

AA, area of absolute cardiac dulness before treatment; *I*, apex-beat; *BB*, area of absolute cardiac dulness after treatment; *II*, apex-beat; *MS*, mid-sternum; *LN*, left nipple.

without a narcotic, and suffered much from dyspepsia. He had undergone severe physical exertion in earlier life, having been an explorer and big-game shooter, and having walked twice across Africa during his expeditions.

The area of absolute cardiac dulness extended from 2 inches to the right of the right border of the sternum

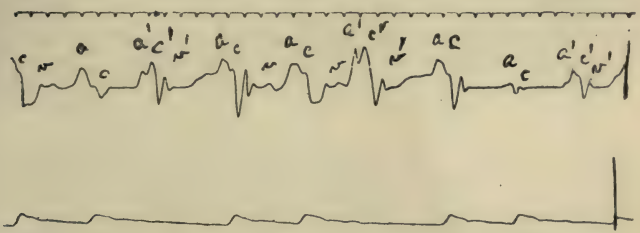

FIG. 57.—POLYGRAPHIC TRACING OF CASE VII. BEFORE TREATMENT, SHOWING A PULSE OF SMALL VOLUME EXHIBITING FREQUENT PREMATURE AURICULAR CONTRACTIONS (*a'c'v'*), TWO EXAMPLES OF WHICH ARE SHOWN. THE *a-c* INTERVAL IS NORMAL. THE PREMATURE CONTRACTIONS ARE NOT STRONG ENOUGH TO PRODUCE ANY EFFECT UPON THE RADIAL PULSE.

to the left nipple-line, the apex-beat being just inside the left nipple-line (Fig. 56, *AA*).

A loud blowing systolic murmur was heard all over the cardiac area, but was most intense at the apex, and was conveyed into the axilla. His blood-pressure was 75-125 millimetres Hg. The case was undoubtedly one of cardiac dilatation, due to

weakening of the myocardium and mitral regurgitation. He gradually improved under treatment, and before the end of the course of twenty-five baths, extending over five weeks, he had lost the dyspnœa, palpitation, and dyspepsia, could walk for a quarter of an hour to 20 minutes, and slept fairly well with a very occasional narcotic. His cardiac dulness had decreased to normal, extending from the left

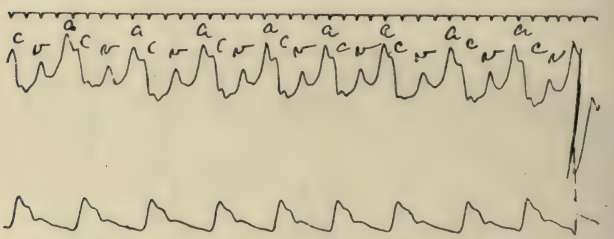

FIG. 58.—POLYGRAPHIC TRACING OF CASE VII., FIVE MONTHS AFTER TREATMENT, SHOWING A PERFECTLY REGULAR PULSE OF MUCH IMPROVED VOLUME. THE *a-c* INTERVAL IS NORMAL; PULSE-RATE 68 PER MINUTE.

border of the sternum to 2 inches inside the left nipple (Fig. 56, *BB*), the systolic murmur was very much softer and much less diffuse. He returned home to Yorkshire, and was able to walk about his grounds with comfort, and to go up and downstairs, which he had not been able to do since the beginning of his illness.

I saw this patient five months after treatment, when he informed me that he could keep about all

day, sleep and eat well, and had no dyspepsia. His cardiac dulness was still absolutely normal, and the pulse was quite regular and of good volume (Fig. 58).

I saw the patient again seven months after treatment. He was still keeping quite well, the cardiac dulness was normal, and the pulse was regular and of good volume (Fig. 59).

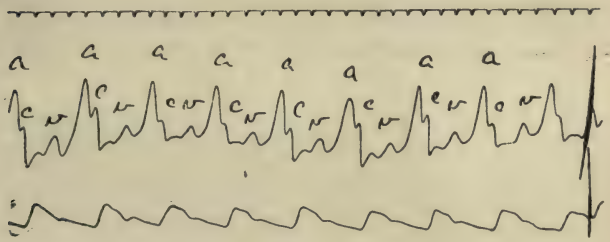

FIG. 59.—POLYGRAPHIC TRACING OF CASE VII., SEVEN MONTHS AFTER TREATMENT, SHOWING REGULAR PULSE OF GOOD VOLUME, *a-c* INTERVAL NORMAL, RATE 70.

Just a year after the first course of baths the pulse became somewhat irregular again, the cardiac symptoms began to return and the heart showed slight dilatation; he therefore took a second course of baths as a precautionary measure. His health has remained satisfactory since that time, and he is now able to lead a normal life, walking, driving, and shooting. Fig. 60 is a polygraphic tracing taken two years after his second course of baths when he

was still in good health: his cardiac dulness was normal and the systolic mitral murmur was still present.

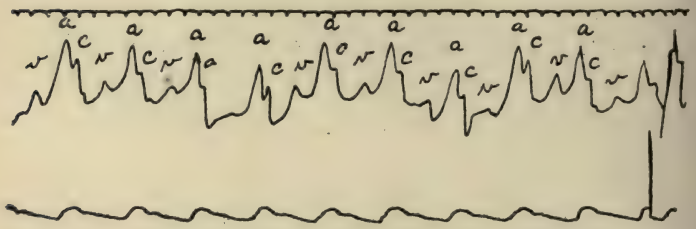

FIG. 60.—POLYGRAPHIC TRACING OF CASE VII., TWO YEARS AFTER SECOND COURSE, SHOWING PERFECTLY REGULAR PULSE OF SMALL VOLUME.

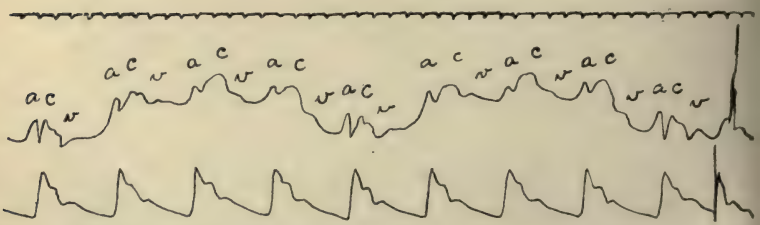

FIG. 61.—POLYGRAPHIC TRACING OF CASE VII., TWO YEARS AND SEVEN MONTHS AFTER SECOND COURSE, SHOWING ABSOLUTELY REGULAR PULSE OF GOOD VOLUME, 62 PER MINUTE.

Two years and seven months after the second course of baths the patient felt in perfect health, he was able to do a long day's work, from 9 a.m. till

10 p.m., he slept well and could eat anything without any signs of dyspepsia, his pulse was strong in volume, 62 per minute, and absolutely regular in rhythm, and he said he had not felt any intermittency for over twelve months (Fig. 61). The systolic murmur was still present and could be heard all over the cardiac area, but the area of cardiac dulness was absolutely normal, and the impusle was 1½ inches inside the left nipple-line and was not too forcible or diffuse.

CASE VIII.—The patient, a lady aged twenty-one years, was sent to me by Dr. T. A. Bowes, of Herne Bay. She had had scarlet fever at the age of seven years, and rheumatic fever and endocarditis twice, once when she was seventeen and again at nineteen. She was in bed three months after the second attack, and since then had suffered from palpitation, dyspnœa, severe headache, vertigo, dyspepsia, and pain over the region of the heart and down the left arm, on the slightest exertion. When I first saw her she was very thin, anæmic, and cyanosed, and suffered from marked dyspnœa; her pulse was 92 per minute, and exhibited frequent intermittences, which proved to be due to premature ventricular contractions (Fig. 62).

The cardiac impulse could be seen and felt all over the left side of the chest, the apex-beat was diffuse and forcible, in the left nipple-line, the area

of cardiac dulness was markedly enlarged, extending from just beyond the left nipple-line to 1½ inches to the right of the middle-line (Fig. 63, *AA*). A loud systolic murmur was heard all over the cardiac area and was conveyed into the left axilla and all over the left side of the back, indicating mitral regurgitation. The heart was evidently markedly

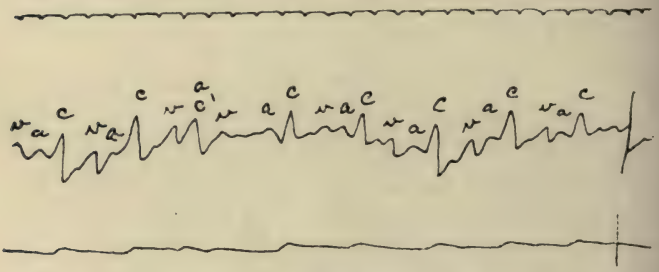

FIG. 62.—POLYGRAPHIC TRACING OF CASE VIII., BEFORE TREATMENT, SHOWING PULSE OF VERY SMALL VOLUME AND IRREGULARITY DUE TO PREMATURE VENTRICULAR CONTRACTIONS (*c'*) OCCURRING SIMULTANEOUSLY TO THE AURICULAR CONTRACTIONS; PULSE 100 PER MINUTE.

dilated and somewhat hypertrophied. The blood-pressure was 100-140 millimetres Hg.

As the patient had been treated by rest and cardiac tonics for two years, I advised a course of 'Nauheim' baths, which she took under my care in London. The headaches and palpitation began to improve from the first, and at the end of the treatment she was better in all ways, the palpitation

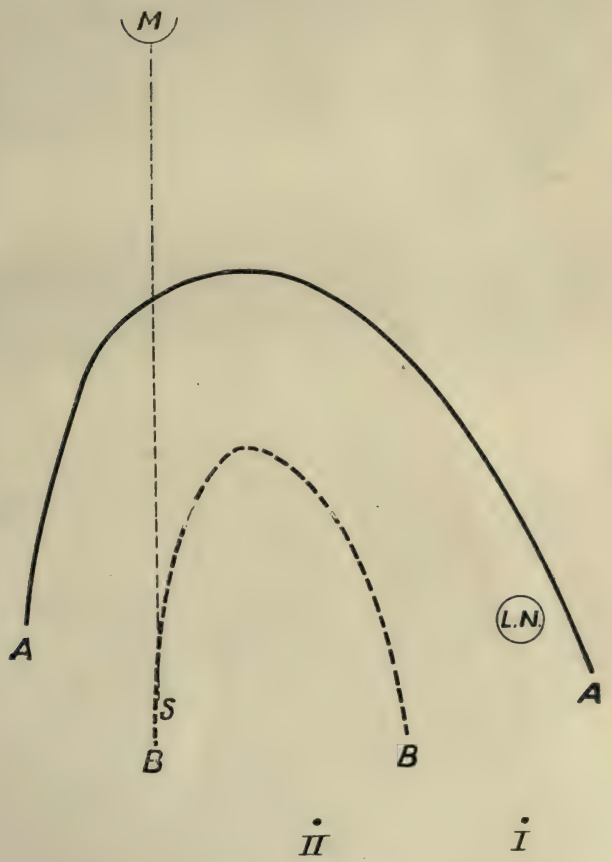

FIG. 63.—CASE VIII.

AA, area of absolute cardiac dulness before treatment; *I*, apex-beat before treatment; *BB*, area of absolute cardiac dulness after treatment; *II*, apex-beat after treatment; *LN*, left nipple; *MS*, mid-sternum.

was much less and the dyspepsia much better. The pulse was regular, less rapid, and of much better volume (Fig. 64). Before treatment the pulse had been 92 sitting and 130 standing, after treatment it was 84 sitting and 96 standing.

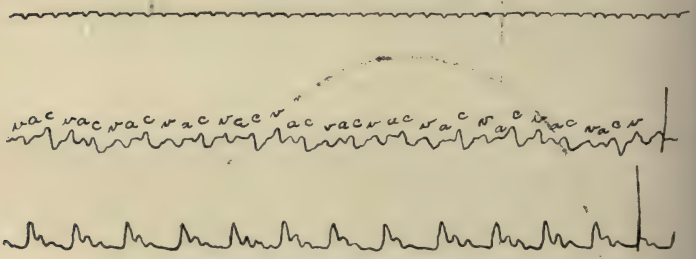

FIG. 64.—POLYGRAPHIC TRACING OF CASE VIII., AFTER TREATMENT, SHOWING REGULAR PULSE OF MUCH IMPROVED VOLUME.

A month after treatment the patient wrote to me saying she was much better in all ways, was eating and sleeping well and had put on flesh. Fifteen months after treatment I saw the patient again; she was in every way improved in health, had put on over half a stone in weight, and could go about and enjoy life, the pulse was still absolutely regular and of good volume.

Fatty Heart.

A marked, general, and steady increase in the weight of the whole body is always accompanied, or followed by, fatty degeneration or infiltration of the heart, and it is impossible for the obese person to have a healthy heart. No hard-and-fast line can be drawn between degeneration and infiltration, as these conditions are each caused by a deoxygenated blood-supply, and are so intimately connected that they cannot be satisfactorily separated in clinical investigations. The fatty heart is very easily fatigued and consequently dilates very readily, and it is therefore not surprising to find that in some cases of fatty dilated heart the blood-pressure is not abnormally high, and that the heart has given way under a normal or even subnormal tension; but as a rule the tension is raised, though not to a great extent. As fatty degeneration slowly increases, the patient gives up first one and then another form of exercise, and ultimately is unable to walk more than a short distance with comfort, on account of the dyspnœa arising from a dilated and fatty heart and an increasing bulk. As time advances all the organs become congested, the bowels, stomach, and liver cease to perform their functions perfectly, and the lungs become subject to a chronic catarrhal condition, accom-

panied by attacks of cardiac asthma, which cause great distress and prevent the patient from sleeping in the recumbent position, and palpitation and cardiac pains follow on any exertion.

It takes many years for those suffering from this malady to get into the above condition, but the very slowness and insidiousness of its advance is a danger, as the patient, who is usually approaching, or past middle age, gradually accommodates himself or herself to the altered conditions, and begins to regard them more as a necessary accompaniment of advancing years than as a disease which can be first alleviated and then kept in check by suitable treatment.

When, in time, the symptoms become irksome and painful, an effort is often made to improve matters by a rigid diet, or, worse still, by indulgence in violent exercise. If the first line of treatment is adopted the weight will probably be reduced, whilst a strict rule of diet is adhered to, but the health will be rendered worse rather than improved, as this class of patient does not possess the physical stamina necessary to withstand either an entire alteration in diet or a modified starvation. If the second line of treatment is adopted, the heart's action is further impaired and the severity of the symptoms is increased, with often a fatal result.

The administration of drugs, such as thyroid extract, is not free from danger, and many cases have been made seriously ill by this method of treatment, although thyroid is extremely useful as an aid to reducing weight, after the heart and circulation have been restored to a normal condition.

In the treatment of such cases I have never restricted the diet in quantity, either as regards solid or fluid, but I have reduced the carbohydrates to a minimum, ordering well-cooked toast instead of bread, cutting off sugar entirely, and limiting the sweets taken to custard, jelly, junket, or stewed fruit.

If the patients will adhere to this dietary, which is by no means severe, and allows plenty of variety, I have found they will maintain the benefit derived from the course for very many years. Case X. is an example of this. If, on the other hand, the patients will not abstain from any class of food for long, but return to a farinaceous and carbohydrate diet directly the symptoms are better and the weight reduced, then further treatment will be required at intervals. Case IX. is an example of this latter class.

Case IX.—The patient, a lady, fifty-eight years of age, consulted me on account of great stoutness, dyspnœa, bronchial catarrh, palpitation, and increasing œdema of the legs. She was somewhat

cyanosed, markedly obese, weighing 18 stone, and was 5 feet 10 inches in height; her dyspnœa, even on the slightest exertion, was marked, and she could not walk except at a slow pace and for a short distance. The legs were decidedly œdematous up to the knees, pitting fairly deeply on pressure. Her pulse in the upright position was 96 per minute, regular in time and volume, and of small volume; her blood-pressure was 75-150 millimetres Hg. Her area of cardiac dulness was much enlarged, extending from 2 inches outside the left nipple-line to 3 inches to the right of the mid-sternal line (Fig. 67, *AA*); the cardiac sounds were heard very faintly at the apex, but were not audible over the base of the heart. There was no albumen or sugar in the urine. The polygraphic tracing, Fig. 65, showed, in the venous curve, an *A*—*C* interval slightly *longer* than the normal, and in the radial curve a regular pulse of small volume, and 70 per minute, in the recumbent position. This patient had a course of twenty-five baths extending over a period of five weeks. At the conclusion of the treatment her weight was 15 stone 12 pounds, having dropped 2 stone 2 pounds in the five weeks. She was of a good colour, the dyspnœa was decidedly less marked, and she could take fairly lengthy walks of one or two miles' extent. There was no œdema of the legs, and the bronchial catarrh was much less troublesome. The

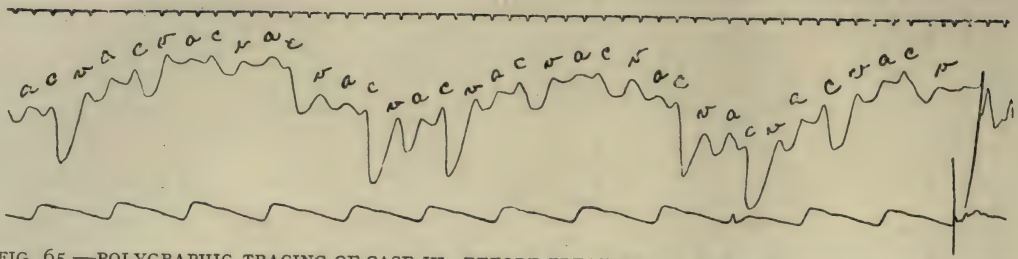

FIG. 65.—POLYGRAPHIC TRACING OF CASE IX., BEFORE TREATMENT. THE *a-c* INTERVAL IS SLIGHTLY LONGER THAN THE NORMAL; PULSE 70 PER MINUTE IN RECUMBENT POSITION.

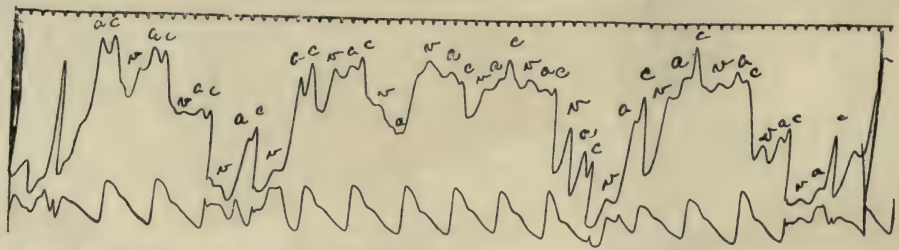

FIG. 66.—POLYGRAPHIC TRACING OF CASE IX., AFTER TREATMENT; PULSE 68 PER MINUTE. THE *a-c* INTERVAL IS NORMAL.

pulse was 90 in the erect and 68 in the recumbent position. The area of cardiac dulness was markedly less, extending from 3 inches inside the left nipple-line to the mid-sternal line (Fig. 67, *BB*). The position of the breast, which was large, had somewhat

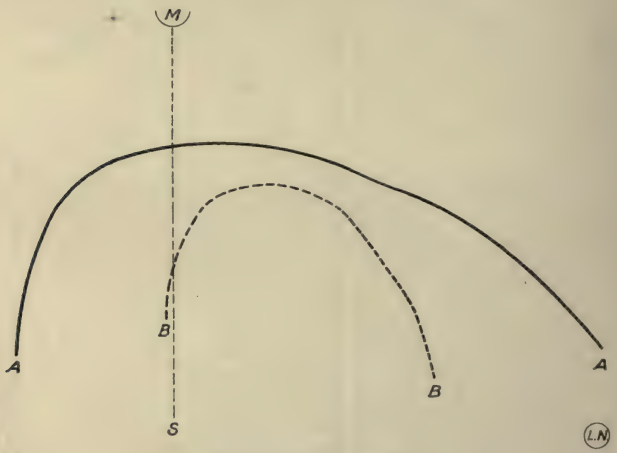

FIG. 67.—CASE IX.

AA, area of absolute cardiac dulness before treatment; *BB*, area of absolute cardiac dulness after treatment; *MS*, mid-sternum; *LN*, left nipple.

altered by the loss of weight, so that the nipple was not exactly in the same position, and the area of cardiac dulness had not decreased quite so much on the left as would appear from the measurements. The area of cardiac dulness was, however, about normal. The cardiac sounds were much stronger

and could be well heard both at the apex and over the base of the heart; no murmur was audible at any time during treatment. The blood-pressure was 80-130 millimetres Hg., having fallen 20 millimetres since the commencement of the treatment. Fig. 66, a polygraphic tracing taken at the end of the course, shows, in the venous curve, an *A*—*C* interval which is quite normal, and in the radial curve, a pulse of much improved volume and slower rate. The symmetry of the tracing is spoilt by the pens meeting at times, but the middle portion is clear.

This patient has been under my observation for seven years. During that period she has had four courses of baths, as, on account of her appetite being large, it was not possible to regulate her diet properly, and she consequently tended to put on flesh and develop cardiac symptoms about a year or eighteen months after treatment. By means of this treatment her weight has been kept down between 15 and 16 stone, and she has been able to lead a comfortable and fairly active life, walking from two to four miles a day. Had she been able to keep to a strict diet after the first course, I do not believe she would have required further treatment for a long period.

Case X.—The patient, a lady aged fifty-one years, had, for five or six years before she saw me,

been putting on weight and suffering from indigestion, shortness of breath, and palpitation; she could only go upstairs with difficulty, and never walked more than a few hundred yards on account of

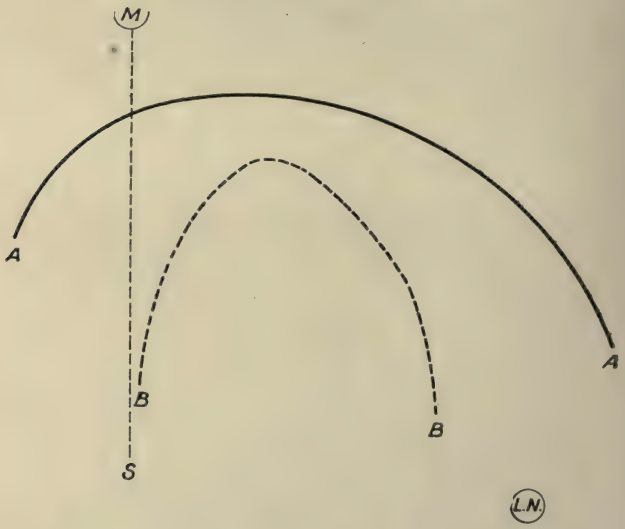

FIG. 68.—CASE X.

AA, area of absolute cardiac dulness before treatment; *BB*, area of absolute cardiac dulness after treatment; *LN*, left nipple; *MS*, mid-sternum.

dyspnœa and exertion; as her symptoms were getting steadily worse she consulted me. She was very stout, pale, flabby, and anæmic, her height was 5 feet 3 inches, and her weight 12 stone 6 pounds.

Her blood-pressure was 90-150 millimetres Hg. Her father had died of apoplexy at the age of fifty, and her mother of nephritis at the age of thirty-six, so there was a definite family history of circulatory trouble. The pulse was of fair volume, 82 per minute, and the heart-sounds were clear. The area of cardiac dulness was greatly increased, measuring 9 inches across and extending from 1½ inches outside the left nipple-line to 1½ inches to the right of the mid-sternal line (Fig. 68, *AA*).

I gave this patient a five weeks' course of baths. Her health did not improve much during the course, and she only lost 6 pounds in weight, but she was able to walk a mile with comfort, lost the palpitation and a good deal of the dyspnœa, and had a better colour. The area of absolute cardiac dulness was greatly reduced, measuring only 4½ inches across, and extending from 1½ inches inside the left nipple-line to half an inch to the left of the middle-line (Fig. 68, *BB*).

She returned home to North Wales and wrote to me a month later saying that she was continuing to improve in health, had not felt so well for several years, and was losing about 1 pound in weight a week, her weight then being 11 stone 9 pounds. I heard from this patient occasionally that she was keeping in good health, that the weight was keeping

down, and that she could walk several miles with comfort. Two years and three months after treatment she wrote to me saying she was in excellent health and weighed 10 stone 9 pounds, nearly 2 stone less than before treatment.

CHAPTER VI

INFLUENZAL MYOCARDITIS AND TOXÆMIA

THE dilated, enfeebled, irritable, and often irregularly-acting heart, with damaged nodes or bundles, a sequela of influenza, is one of the most common forms of cardiac disease that is met with to-day. It is also one that responds excellently to the 'Nauheim' treatment, though in many instances it resists treatment by rest, drugs, or change of air, so that the unfortunate sufferer often becomes a chronic invalid, with nothing but a broken and useless life to look forward to. I have seen many of these cases restored to perfect health by the 'Nauheim' treatment, after months of change of air and rest in bed, or on the sofa, have done little or no good. If they are of a severe type they may require two courses with an interval of a year or eighteen months to restore them to health. In the case of patients of advancing years, who in addition to having had severe influenza, suffer from some chronic disease such as rheumatism, arterio-

sclerosis, or gout (Case I., Chapter III.), it is often necessary to repeat the treatment several times at various intervals; but in the case of moderately young patients who suffer from no chronic disorder, one course of treatment is often sufficient (Case XIII.).

Toxæmia.—All cases of cardiac toxæmia, or enfeeblement, caused by prolonged illness of any kind, such as typhoid, malaria, pneumonia, or multiple abscesses, belong to this group and constitute a class in which the baths are a most valuable aid to such methods of cure as vaccines, rest, tonics, and change of air; a much more rapid return to health being obtained in this manner than could otherwise be expected, especially if cardiac dilatation and intermittent pulse are present, as in Case XIII.

Case XI.—The patient, a man aged sixty-seven years, had had several attacks of influenza and suffered from palpitation and cardiac pain; he had also had several attacks of faintness, and a week before he saw me he had suddenly fallen down in a faint and had not recovered consciousness for some time. When I first saw him his heart was markedly dilated, the area of absolute cardiac dulness extended from the left nipple-line to 1½ inches to the right of the middle-line, and measured 6 inches across at the nipple level (Fig. 71, *AA*).

His pulse varied from 46 to 60 per minute, and exhibited occasional premature auricular contractions (Fig. 69).

His blood-pressure was 70-133 millimetres Hg., and his bloodvessels were remarkably healthy for a man of his age; the urine was normal. The heart-sounds were quite clear but somewhat weak. He took a course of twenty-five 'Nauheim' baths in

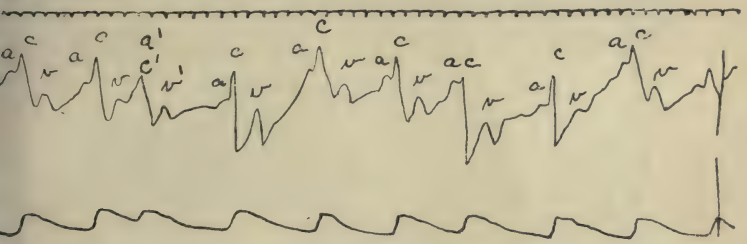

FIG. 69.—POLYGRAPHIC TRACING OF CASE XI., BEFORE TREATMENT, SHOWING A PULSE OF SMALL VOLUME AND ONE EXAMPLE OF THE PREMATURE AURICULAR CONTRACTIONS (*a'c'v'*).

his own home, and his general health and the physical signs steadily improved. At the end of the course, which extended over five weeks, the area of absolute cardiac dulness extended from 1 inch inside the left nipple-line to the mid-sternal line, and measured $3\frac{1}{2}$ inches across at the nipple level, a decrease of $2\frac{1}{2}$ inches (Fig. 71, *BB*). The pulse was quite regular and of much larger volume (Fig. 70), and the blood-pressure was unaltered.

He continued to enjoy good health for about one year after treatment, but then began to suffer again from palpitation and faint feelings, and as the area of cardiac dulness was distinctly larger than after treatment I gave a second course of baths. This pa'ient is now seventy-six years of age and has been under my care for nine years, during which time he has had seven courses of baths, the latter ones

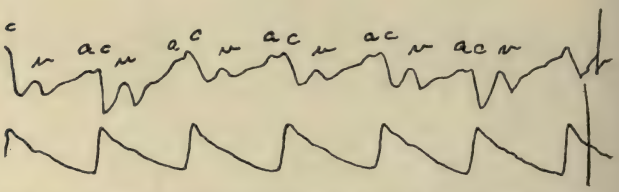

FIG. 70.—POLYGRAPHIC TRACING OF CASE XI., AFTER TREATMENT, SHOWING A PERFECTLY REGULAR PULSE OF GOOD VOLUME.

being only of three weeks' duration. He is hale and hearty, can take long walks, digs in his garden, and enjoys life, but about twelve to eighteen months after a course of baths he begins to have a return of the symptoms and requires further treatment. It is now twenty-one months since his last course and he has not shown any signs of returning symptoms yet, although he had a severe attack of influenza a few months ago. He is of a markedly gouty constitution and has had several attacks of gout

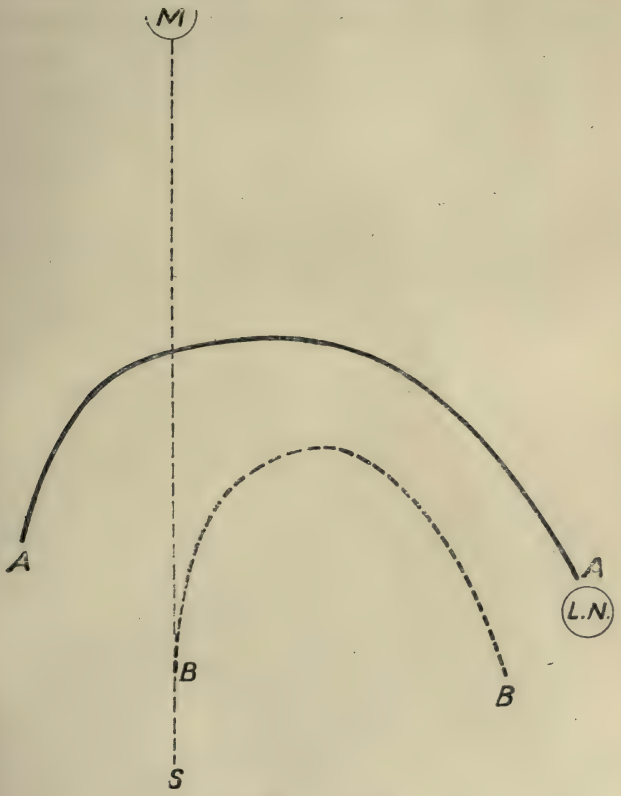

FIG. 71.—CASE XI.

AA, area of absolute cardiac dulness before treatment; *BB*, area of cardiac dulness after treatment; *MS*, mid-sternum; *LN*, left nipple.

and has suffered from sciatica, lumbago, and neuritis. Cases of this kind, when somewhat advanced in age, often require to repeat the course at intervals so as to periodically eliminate toxic materials which accumulate in the system and cause self-poisoning and a return of troublesome symptoms.

CASE XII.—The patient, a man aged forty-seven years, consulted me on account of palpitation, irregular heart's action, and an increasing inability

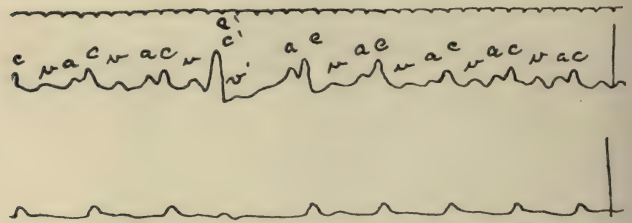

FIG. 72.—POLYGRAPHIC TRACING OF CASE XII., BEFORE TREATMENT, SHOWING EXAMPLE ($a'c'v'$) OF PREMATURE AURICULAR CONTRACTION, AND PULSE OF SMALL VOLUME.

to carry on any physical exercise. He had had pneumonia twice when a boy, pleurisy at the age of twenty-six, and a severe attack of influenza three months before I saw him. Before he felt his heart he had been used to leading a vigorous athletic life, hunting, shooting, etc., but had not been able to do so for four years before he saw me. The patient was pale and puffy, his pulse was small in volume with constant intermittence, due to premature auricular contractions (Fig. 72).

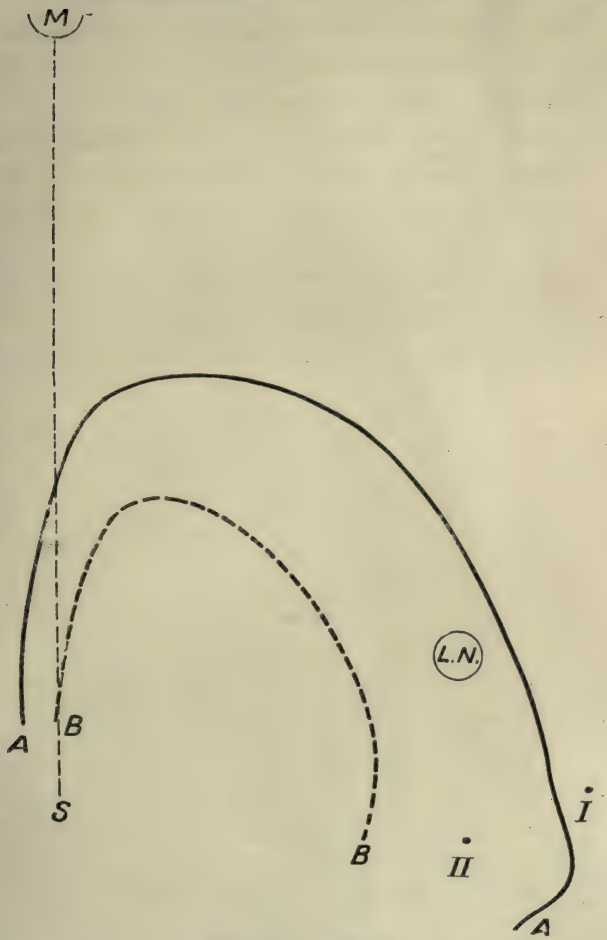

FIG. 73.—CASE XII.

AA, area of absolute cardiac dulness before treatment; *I*, apex-beat; *BB*, area of absolute cardiac dulness after treatment; *II*, apex-beat, *MS*, midsternum; *LN*, left nipple.

The heart-sounds were clear, the blood-pressure was 80-120 millimetres Hg.; the area of cardiac dulness was considerably enlarged, extending from half an inch to the left of the left nipple to the right border of the sternum, and measuring 5 inches across at the nipple level; the apex-beat was 1 inch outside the nipple-line (Fig. 73, *AA*).

I treated the patient with tonics and he had a very easy life for twelve months, but at the end of

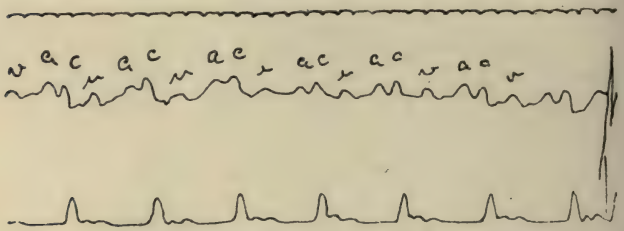

FIG. 74.—POLYGRAPHIC TRACING OF CASE XII., AFTER TREATMENT, SHOWING REGULAR PULSE OF GOOD VOLUME.

this period his health was about the same, so I advised a course of 'Nauheim' baths; he took these under my care in a London hotel, and almost from the first began to improve in health and lose the heart symptoms. At the end of the course his pulse was quite regular and of decidedly better volume (Fig. 74). The area of cardiac dulness was normal, measuring $3\frac{1}{4}$ inches across at the nipple level, as compared with 5 inches before treatment, and extending from 1 inch inside the left nipple to the middle-line; the

apex-beat was just in the nipple-line. I saw this patient fourteen months after treatment; he felt and looked well, was of good colour and able to enjoy a normal life and hunt and shoot, his pulse was of fair volume and regular in time (Fig. 75), and the area of cardiac dulness was unaltered.

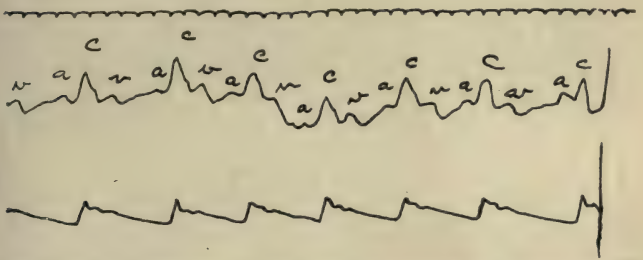

FIG. 75.—POLYGRAPHIC TRACING OF CASE XII., FOURTEEN MONTHS AFTER TREATMENT, SHOWING REGULAR PULSE OF FAIR VOLUME.

CASE XIII.—The patient, a man aged forty-six years, had a severe attack of multiple abscesses, which was followed by a spell of very arduous work during the winter and spring. In the early summer, he began to suffer from general ill-health accompanied by constant cardiac irregularity, which caused great discomfort and insomnia. Treatment with bromides and digitalis relieved him for a time, but as he found the relief only temporary, and was not able to do his work without great fatigue, he consulted me. I found him to be suffering from a

very dilated and weakened heart exhibiting constant irregularities. The absolute cardiac dulness extended from an inch outside the right border of the sternum to the left nipple-line, measuring at the level of the nipple 6 inches (Fig. 79, *AA*). The heart-sounds were slapping at the apex, and scarcely audible at the base. The polygraphic tracing exhibited premature contractions of varying kinds,

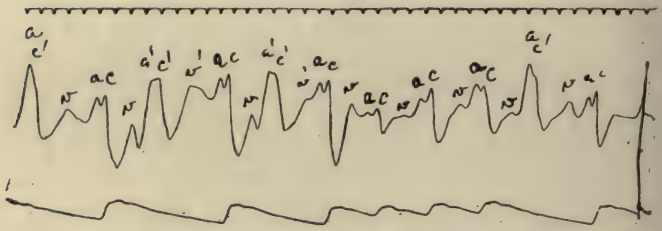

FIG. 76.—POLYGRAPHIC TRACING OF CASE XIII., BEFORE TREATMENT, SHOWING AURICULAR (*a'c'v'*) AND VENTRICULAR (*c'*) PREMATURE CONTRACTIONS, AND A PULSE OF POOR VOLUME.

some auricular and some ventricular, but of so feeble a character that they did not reach the radial pulse (Fig. 76).

I started him on a course of twenty baths, and after eight of these his pulse became quite regular and of improved volume (Fig. 77). The cardiac dulness was less, and he felt much better.

After twenty baths he felt quite well, and slept well; the polygraphic tracing showed a regular

pulse of good volume (Fig. 78). The area of cardiac dulness extended from the left border of the sternum

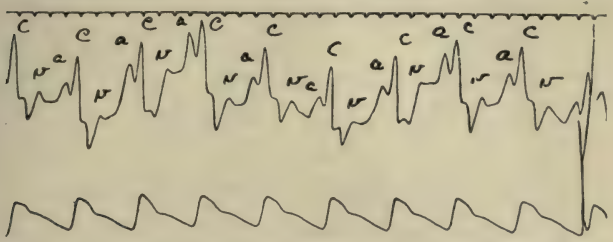

FIG. 77.—POLYGRAPHIC TRACING OF CASE XIII., AFTER EIGHT BATHS, SHOWING A REGULAR PULSE OF IMPROVED VOLUME. RATE, 75 PER MINUTE.

to 1½ inches inside the left nipple, measuring 4 inches across (Fig. 79, *BB*). The sounds at the apex were natural, and those at the base could be well heard.

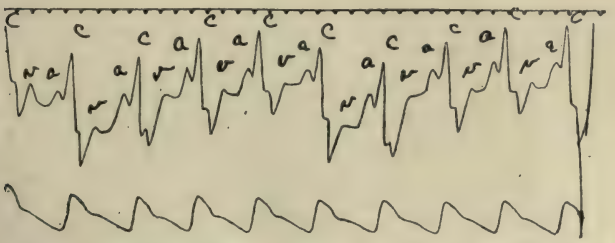

FIG. 78.—POLYGRAPHIC TRACING OF CASE XIII., AFTER EIGHTEEN BATHS, SHOWING REGULAR PULSE OF GOOD VOLUME.

The patient went away intending to take a month's holiday. He indulged in a good deal of golf, and

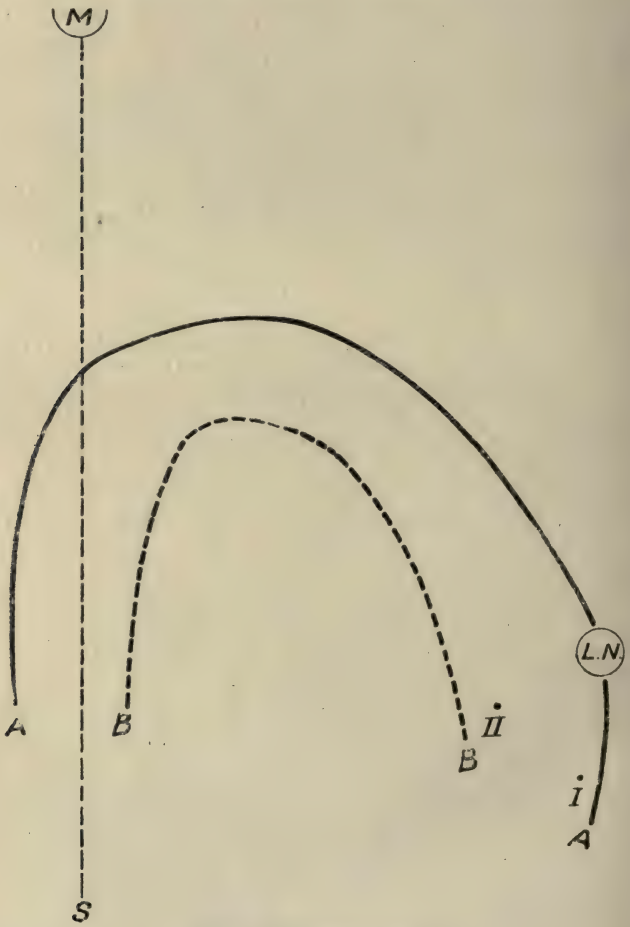

FIG. 79.—CASE XIII.

AA, area of absolute cardiac dulness before treatment; *I*, apex-beat; *BB*, area of absolute cardiac dulness after treatment; *II*, apex-beat; *MS*, mid-sternum; *LN*, left nipple.

returned to London and work in ten days, but he was not really fit for work, and consequently had a relapse. After about ten days' work, he was forced to take a month's rest, since when he has been perfectly well and able to work hard and play golf.

It is now three years and six months since he had treatment, and during that time he has had constant arduous professional work, starting early in the morning and not ending till late at night, but despite this he has kept in good health during the whole of this period.

CHAPTER VII

'SOLDIER'S HEART.' HEART-STRAIN

'SOLDIER'S heart' and heart-strain are so closely allied that it is very difficult to differentiate between them in any way. In my opinion the patient suffering from 'soldier's heart' is simply a military man who has undergone excessive mental or physical strain, or a combination of both; and whose heart has broken down under that strain. I have had under my care a number of officers, mostly young men, who have been invalided from active service on account of cardiac breakdown. These patients, without exception, have been passed for service as physically sound, but, on careful inquiry, I have always obtained a history of former heart trouble, such as strain in school athletics, necessitating a long rest, or an attack of rheumatic fever in childhood. I believe that these facts explain why the opinions of various experts differ so widely as to the causation of 'soldier's heart,' as cases of cardiac weakness due to various causes break down entirely under severe and unusual strain, some of them being

due to a pre-existing hyperthyroidism and others to entirely different conditions. Hence the various theories regarding the causation of 'soldier's heart.'

In most of the cases I have seen the only signs of abnormality of the heart present were slight cardiac dilatation, cardiac irritability, and marked sinus arrhythmia, and the most prominent symptom a severe form of general debility and exhaustion, so that the patient has been incapable of any sustained effort, either of body or mind, despite the fact that he has usually had a period of entire rest from work of some months' duration.

Under treatment the cardiac dilatation has disappeared, the patient has recovered from the condition of exhaustion and debility, has been able to take moderate exercise with enjoyment, and gradually to resume his ordinary habits, and to return to his military work. The sinus arrhythmia has usually become less marked, but has generally persisted to a certain extent, and I am therefore led to believe that this arrhythmia was not a new development, but that it had probably been present for a long period. Since the invention of the polygraph and the electrocardiograph it has become possible to classify the irregularities of the heart's action, and to distinguish those which are of serious import from those which are comparatively harm-

less. Before the introduction of these instruments cardiac irregularity of any kind was always regarded with grave suspicion, for it was not then possible to differentiate with any certainty between the various forms of irregularity.

The careful physician, knowing that he was treading on uncertain ground, had to be guarded in his prognosis and on the safe side in his treatment, in any case in which the normal regularity of the heart-beat was affected. In consequence, many cases, especially amongst children, were condemned, unnecessarily, to a very restricted and unhealthy life.

The pendulum has now swung in the opposite direction, and many cardiologists maintain that certain irregularities, especially those which are due to vagus influence, can be disregarded, both from the point of view of prognosis and treatment. This attitude is the natural result of the realization that the teaching of the past on this subject was faulty, but it does not allow for the facts that these new methods of investigation are of comparatively recent date, that the effects of cardiac irregularities are often not apparent for years after their development, and that they often lie dormant till some extra strain on the muscular or nervous system brings them suddenly into prominence.

I am convinced, from observation of many cases

in adults, especially young adults, that the presence of any kind of irregularity in the cardiac rhythm is not a normal condition, and that it should not be disregarded. In all cases in which it is present, a careful inquiry into the previous history, and a detailed examination of the heart, to ascertain the presence or absence of dilatation, should be made, before the sign of irregular rhythm is set aside as a matter of no importance. It stands to reason that an organ which is working irregularly, whatever form that irregularity may take, is not in as satisfactory a condition as one which maintains a regular rhythm.

Of the three following cases showing the effect of the ' Nauheim ' treatment upon ' soldier's heart ' and heart-strain, the first two are those of military men and the third that of a civilian. I have found that absolute rest, except in the acute stage of the breakdown, is not advisable. When the patient is able to get about at all he should take as much walking exercise a day as he can do, without feeling done up. Drugs seem to be of little or no use in these cases after a certain stage.

Case XIV.—Captain J., aged twenty-one years, was sent to me on March 20, 1916, by Dr. Arthur P. Luff, who informed me that the patient had been under his care, taking heart tonics and resting from work since January 26, 1916, and that, as his cardiac

condition did not improve markedly, he had advised a course of ' Nauheim ' baths.

The history of the case is as follows: At eleven years of age he suffered from severe dilatation of the heart after a seven miles' paper-chase, was in bed eight weeks, and not allowed to play any games for three years. In July, 1915, he suffered from severe shell-concussion in France, was laid up in hospital for seven weeks, and then put on light duty; since that time he has had seven medical boards, and has always been reported as only fit for light duty. In December, 1915, while out shooting, he was attacked with vertigo, collapse, and syncope, and shortly after this he consulted Dr. Luff.

When I first saw the patient on March 23, 1916, he looked in good health, his pulse in the recumbent position was 88, and in the erect 112, per minute, and was of marked sinus arrhythmia; his blood-pressure was 70-150 millimetres Hg.; a blowing systolic murmur was heard over the aortic area on lying down, but was not heard in the erect position, and the first sound at the apex was reduplicated. The apex-beat was forcible, and just inside the left nipple-line; the area of cardiac dulness extended from just inside the left nipple to nearly 1 inch to the right of the mid-sternal line, and measured nearly 4 inches across at the nipple level.

A polygraph tracing (Fig. 80) showed a pulse of poor volume and of very marked sinus arrhythmia, the longest waves measuring 15 millimetres, as compared to 8 millimetres of the shortest. It will be seen from the tracing that the *A*—*C* interval is normal and that the '*b*' wave is well marked in the long waves. (The '*b*' wave is caused by diastolic closure of the auriculo-ventricular valves at the end

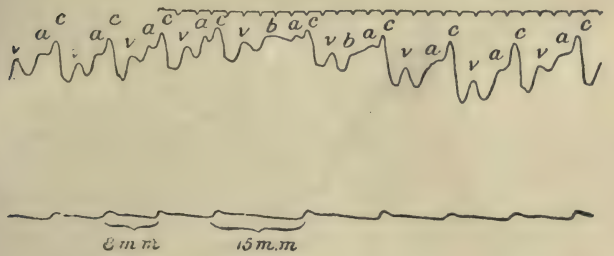

FIG. 80.—POLYGRAPHIC TRACING BEFORE TREATMENT, SHOWING VERY MARKED SINUS ARRHYTHMIA AND A PULSE OF POOR VOLUME (CASE XIV.).

of the ventricular filling, the flow from auricle to ventricle is suddenly checked, and a reflex occurs into the jugular vein—the '*b*' wave.)*

After a course of twenty-five 'Nauheim' baths the patient felt well, had lost the feeling of exhaustion, and was able to take exercise with enjoy-

* 'Explanation of "*b*" wave.' *Quarterly Journal of Medicine*, Dr. T. Davenport-Windle.

ment. The polygraphic tracing (Fig. 81) taken after treatment shows a pulse of improved volume, but the sinus arrhythmia is still present, as well as the '*b*' wave, in the longer waves. The area of cardiac dulness was normal, measuring about 2½ inches across at the nipple level. The blood-pressure was 50-115 millimetres Hg., as compared to 70-150 millimetres Hg. before treatment.

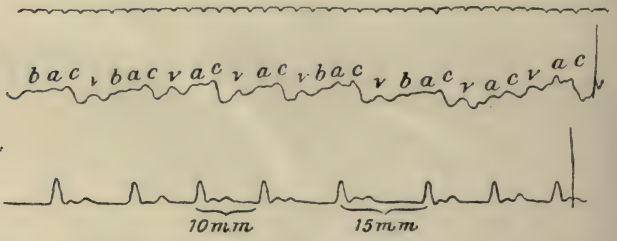

FIG. 81. — POLYGRAPHIC TRACING, SHOWING IMPROVED VOLUME OF THE PULSE, BUT PERSISTENT SINUS ARRHYTHMIA (CASE XIV.).

The sinus arrhythmia is not quite so marked as before treatment, the shortest pulse-waves being 10 millimetres long, and the longest 15 millimetres, as compared with 8 and 15 before treatment; it was also not so constant. A few months later he was able to return to military duties.

CASE XV.—Captain L., aged thirty years, consulted me in March, 1916. He had scarlet fever in 1907, followed by rheumatic fever. On December

28, 1915, he suffered from severe shell-shock, followed by an attack of rheumatism early in January, 1916; since which time he had been laid up entirely. When I first saw the patient, he looked pale and flabby, he was incapable of any exertion, and could only move about his bedroom with the aid of two sticks, for the left leg and thigh were very stiff from rheumatism, and any movement caused

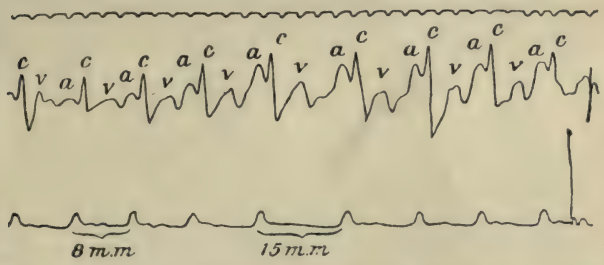

FIG. 82.—POLYGRAPHIC TRACING BEFORE TREATMENT, SHOWING SINUS ARRHYTHMIA AND POOR VOLUME OF PULSE (CASE XV.).

palpitation. The area of cardiac dulness was enlarged, measuring 5 inches across at the nipple level, and extending from just inside the left nipple to the right border of the sternum; the apex-beat was just felt in the nipple-line, the cardiac sounds were weak, but no murmur was present; the pulse was 96 per minute in the prone position, and 108 in the erect; the blood-pressure was 70-105 millimetres Hg. A polygraphic tracing (Fig. 82) showed a

pulse of poor volume and of marked sinus arrhythmia, the longest wave measuring 13 millimetres and the shortest 8 millimetres. The patient had been in bed for two months, and had had several weeks' massage, with only slight improvement of the stiffened limb; he was stiff in his neck and back, but there were no joint lesions.

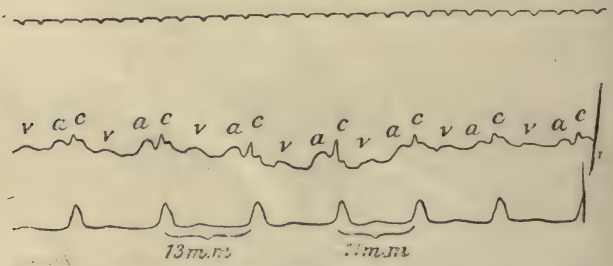

FIG. 83.—POLYGRAPHIC TRACING AFTER TREATMENT, SHOWING PULSE OF IMPROVED VOLUME AND SLOWER RATE, THE SINUS ARRHYTHMIA BEING STILL PRESENT IN A LESS DEGREE (CASE XV.).

I advised a course of modified 'Nauheim' baths, resembling the 'Nauheim' baths in constituents, but at a higher temperature, on account of the rheumatism, and he went into a nursing-home for that purpose. After a course of twenty-five baths, extending over five weeks, he could walk about comfortably, without sticks, but with a slight limp. The area of cardiac dulness was normal, measuring about 2 inches across on the nipple level, and the apex-

beat was 1 inch inside the nipple-line; the rate of the pulse was 80 in the prone position and 92 in the upright position. The blood-pressure was unaltered. The polygraph tracing (Fig. 83) shows a pulse of slower rhythm and improved volume. The sinus arrhythmia is still present, but is not so marked, the longest wave being 13 millimetres, and the shortest 11 millimetres, as compared to 8 and 13 millimetres before treatment.

A few months later he was able to return to military duties.

Case XVI.—The patient, a big heavy man, aged thirty-five years, weighing 14 stone 6 pounds, a male nurse by profession, nursed a paralyzed patient weighing 23 stone for five years, and for the latter three years of this time he had been troubled with palpitation, irregular cardiac action, pain over the heart, and inability to lie on his right side. Twelve months before I saw him his symptoms increased so much that he had to give up work and lead the life of an invalid. When I first saw him he suffered from marked dyspnœa, his pulse was very irregular and rapid, and of very small volume, the irregularities being due to frequent premature auricular contraction (Fig. 84).

The heart was dilated, the area of absolute cardiac dulness extending from the left nipple-line to 1 inch to the right of the middle-line, and measur-

ing 5 inches across at the nipple level (Fig. 86, *AA*); the apex-beat was feebly felt in the nipple-line;

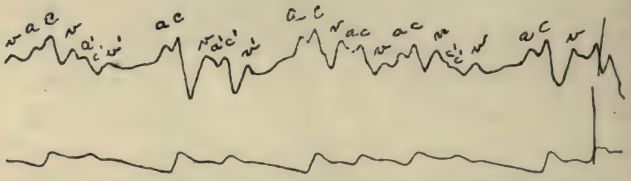

FIG. 84.—POLYGRAPHIC TRACING OF CASE XVI., BEFORE TREATMENT, SHOWING THREE EXAMPLES (*a'c'v'*) OF PREMATURE AURICULAR CONTRACTION.

there was no cardiac murmur, and his blood-pressure was 80-160 millimetres Hg. A month before I saw the patient he had had influenza, and this had

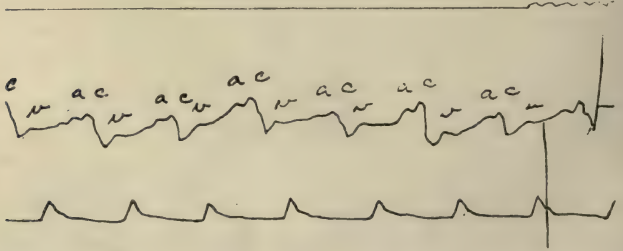

FIG. 85.—POLYGRAPHIC TRACING OF CASE XVI., AFTER TREATMENT, SHOWING A PULSE REGULAR IN TIME AND OF BETTER VOLUME.

exacerbated all his symptoms. He had been treated with rest and cardiac tonics for some time, so I

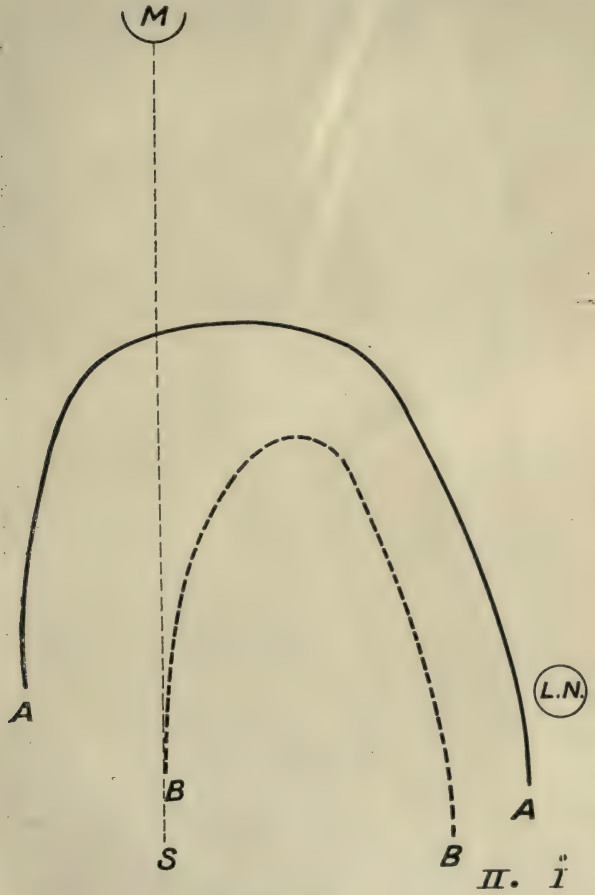

FIG. 86, CASE XVI.

AA, area of cardiac dulness before treatment; *I*, apex-beat; *BB*, area of cardiac dulness after treatment; *II*, apex-beat; *MS*, mid-sternum; *LN*, left nipple.

advised a course of 'Nauheim' baths and took him into a home for this purpose. The character of his pulse and his general condition soon began to improve, and at the end of a course of twenty-four baths, extending over a period of five weeks, his pulse was quite regular in time and better in volume (Fig. 85), and his blood-pressure had fallen to 80-130 millimetres Hg.

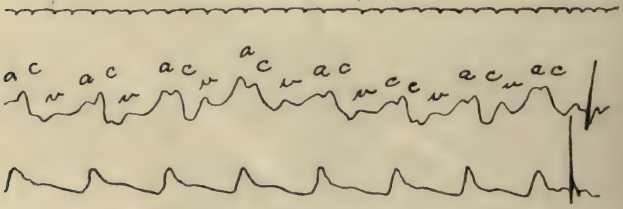

FIG. 87.—POLYGRAPHIC TRACING OF CASE XVI., A YEAR AFTER TREATMENT, SHOWING REGULAR PULSE OF FAIR VOLUME; RATE 78 PER MINUTE.

Seven months after treatment he developed acute appendicitis with abscess, which necessitated an immediate operation; he stood the operation well and made a good recovery. He had been doing munition work for some months before this. A year after treatment he was perfectly well; could walk several miles in comfort; his pulse was absolutely regular and of good volume (Fig. 87), the area of cardiac dulness was normal (Fig. 76, *BB*), and his weight had dropped to 12 stone 10 pounds, nearly 2 stone less than before treatment.

CHAPTER VIII

IRRITABLE HEART. GRAVES' DISEASE

PATIENTS with irritable, rapid, cardiac action, who are prone to palpitation and tachycardia but have no cardiac dilatation, are sometimes greatly benefited by a course of baths. These cases are often a sequela of influenza or some other form of febrile attack, occurring in a neurasthenic and highly-strung patient; and they exhibit a constantly over-rapid pulse which is greatly accelerated by any slight exertion or excitement, and a forcible cardiac action which often keeps the patient awake at night by its violence and rapidity. This condition is often complicated by some defect in the nodes or bundles, causing constant cardiac irregularity, generally due to ventricular or auricular premature contractions. In cases of this temperament these irregularities are apt to be dwelt upon and to cause so much mental anxiety and physical discomfort that the patient's life is a misery. A course of baths, by improving the circulation and setting up a better metabolism, will promote the elimination

of irritating toxic poisons, will soothe the cardiac action, and in this way accelerate the cure and assist other forms of treatment such as rest and quiet. Digitalis and cardiac tonics are of little good in these cases; indeed they are some of the most difficult to deal with. Case XVII. is a typical one of this kind with all the symptoms, including frequent ventricular premature contractions.

Case XVII.—The patient, a woman, aged forty-two, suffered from palpitation, dyspnœa, fainting attacks, dyspepsia, and a constantly intermittent cardiac action which caused great distress and kept her awake at night, so that she rarely had more than a few hours' sleep. She had had influenza several times, but no other definite illness. She was a pale, fragile-looking woman. Her cardiac dulness was somewhat enlarged, extending from the left nipple-line to the right border of the sternum; the impulse was forcible and diffuse, especially after premature ventricular contractions, which were very frequent (Fig. 88). The heart-sounds were clear, the pulse was 92 per minute and very intermittent, the urine was normal, and the blood-pressure was 90-140 millimetres Hg. A polygraphic tracing showed that constant premature ventricular contractions, marked *c'* (Fig. 88), were the cause of the cardiac irregularity. As this patient had had a lengthy treatment by rest and various cardiac tonics, without any

material benefit, I at once started her with 'Nauheim' baths and resistance-exercises. After she had

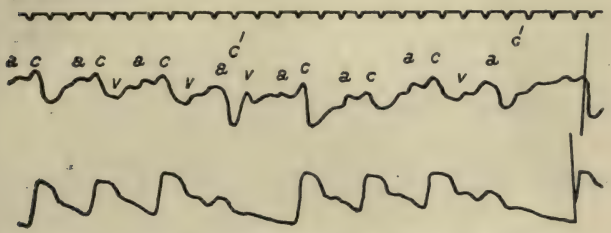

FIG. 88.—POLYGRAPHIC TRACING OF CASE XVII., BEFORE TREATMENT, SHOWING CONSTANT PREMATURE VENTRICULAR CONTRACTIONS (*c'*) FALLING WITH THE REGULAR AURICULAR CONTRACTIONS (*a*); PULSE-RATE 93 PER MINUTE.

taken six baths she was sleeping much better, had no indigestion, the palpitation was rarely noticed,

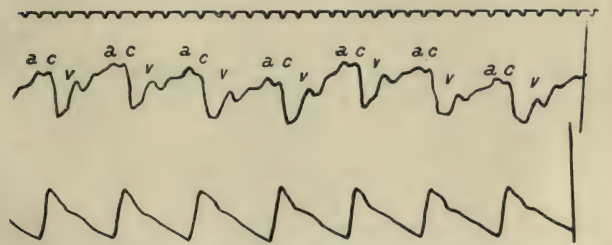

FIG. 89.—POLYGRAPHIC TRACING OF CASE XVII., AFTER SIX BATHS, SHOWING REGULARITY OF RADIAL AND VENOUS TRACINGS, INDICATING IMPROVED CARDIAC CONDUCTIVITY; PULSE-RATE 62, REGULAR.

and the premature ventricular contractions were very much less frequent and were scarcely felt by

the patient. The marked improvement in the cardiac conductivity is well shown by comparing Figs. 88 and 89, the former having been taken before treatment and the latter after six baths had been taken.

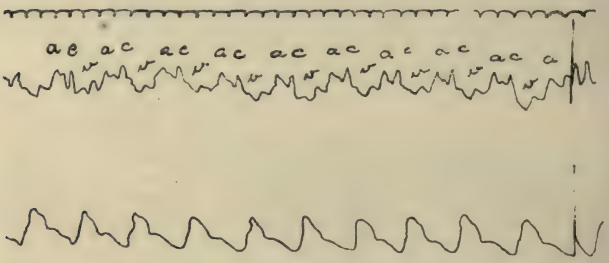

FIG. 90.—POLYGRAPHIC TRACING OF CASE XVII., NINE MONTHS AFTER TREATMENT, SHOWING PERFECTLY REGULAR PULSE; RATE 88 PER MINUTE.

Nine months later the patient was still in better health and sleeping much better, and said her pulse was rarely irregular; a polygraphic tracing (Fig. 90) showed it perfectly regular at the time of examination.

GRAVES' DISEASE

In Graves' disease, especially if cardiac dilatation is present, a course of baths will often be of great benefit, quieting the heart and getting rid of the dilatation, and, at the same time, of the many trying symptoms which are caused by the dilatation, such

as insomnia and dyspnœa. By far the best treatment for a case of this kind is a course of ' Nauheim ' baths given in conjunction with a course of X rays, over the thyroid gland. The X rays cause atrophy of the hypertrophied thyroid, and when skilfully given, this atrophy can be so regulated that just enough thyroid substance is left to carry out the necessary functions of the gland, and not sufficient to cause hyperthyroidism. Having, by this combined treatment, put the heart into a normal condition and arrested the hypersecretion of the thyroid, which was the cause of the cardiac breakdown, the patient is in the best possible position for the avoidance of a recurrence of the disease. In some cases it is necessary to give a second course both of the baths and X rays, but in the milder cases a single course is often all that is wanted to restore the patient to health. I have not treated cases of Graves' disease by these combined methods for a long enough period to be able to judge whether the disease does not recur after an interval of years, but I am certain it is the best method of treatment that has as yet been discovered for this unsightly and serious disorder. The following case is an example in which this method was adopted and the results were decidedly satisfactory:

Case XVIII.—A lady, aged sixty years, was sent to me by Dr. T. L. Drapes, of Chepstow. He informed

me that she had had an operation for cysts of the thyroid, that the right lobe of the thyroid was enlarged, and that she had a dilated heart, and suffered from dyspnœa, rapid pulse, 130 per minute, and coarse tumours of the hands. She had had a shock six months previously and had got worse since. He had kept her in bed for a month. When I first saw the patient she was very thin and anxious-looking, the right lobe of the thyroid was a good

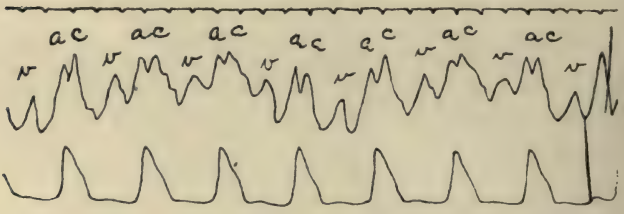

FIG. 91.—POLYGRAPHIC TRACING OF CASE XVIII., THE *a-c* INTERVAL IS MARKEDLY SHORTENED.

deal enlarged, the pulse was 120 per minute, regular and of good volume, and there was nothing special to be noted in a polygraphic tracing, except a marked shortening of the *A—C* interval, a condition which I have often noted to exist in any very rapid cardiac contractions, whether they are dependent upon hyperthyroidism or not.

The blood-pressure was 70-180 millimetres Hg., the heart-sounds were clear, and the heart was markedly dilated, the area of absolute cardiac

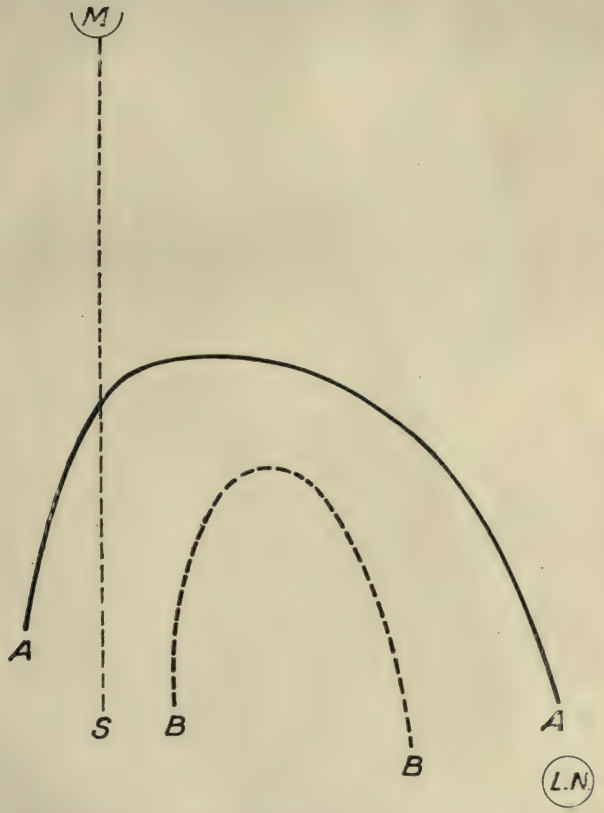

FIG. 92.—CASE XVIII.

AA, area of absolute cardiac dulness before treatment.; *BB*, area of absolute cardiac dulness after treatment; *LN*, left nipple; *MS*, mid-sternum.

dulness extending from the left nipple-line to 1 inch to the right of the mid-sternal line, and measuring 5¼ inches across at the nipple level (Fig. 92, *AA*).

She complained of palpitation, great weakness, and insomnia, with inability to lie on her left side, increasing thinness, headache, and flatulence. I started her treatment with 'Nauheim' baths, and after a period of three weeks, when she was stronger and able to go out, I sent her to Dr. Florence Storey twice a week for X-ray treatment. By the end of the course she was sleeping much better, and could do so comfortably on her left side, she had put on 6 pounds in weight, had little flatulence, and felt altogether stronger. Her pulse varied from about 80 to 90 per minute, the cardiac dulness was normal (Fig. 92, *BB*), and the blood-pressure had fallen to 60-130 millimetres Hg. The patient returned home and wrote to me a month later to tell me that, despite the fact that she had had a bad attack of influenza, she was still steadily improving in health.

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